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PESTICIDES AND PRECAUTIONS - WE NEED BOTH

C & R-ASF

Robert J. Anderson, D.V.M., Deputy Administrator, Agricultural Research Service, U.S. Department of Agriculture, Washington, D. C.

This is harvest time, and we are looking forward to another bountiful Thanksgiving. We like to look backward, also, to that first celebration in Massachusetts that established our Thanksgiving tradition.

However many privations those early colonists suffered, we may be sure that when the chance came to feast, they feasted. At Plymouth Colony, on that autumn day in 1621, the menu included wild turkey, venison, goose, eel pie, lobster, fresh corn bread, fresh salad herbs, wild plums and berries, and red and white wines.

This variety and abundance of food, so hard-won and seldom obtained then, has since become a tradition for most of our countrymen.

Food . . . clothing . . . shelter . . . health . . . the way these daily, basic needs are met in the United States has given us a standard of living that few other nations equal.

A primary concern of the U.S. Department of Agriculture is to help farmers produce plenty of healthful food, and to produce it efficiently. The Department has established a long and illustrious record in helping to protect the safety of this food.

Workers in agriculture, in industry, and in health services share credit for the fact that we can eat anywhere in the United States with confidence-- that the food is not contaminated with dangerous amounts of chemical residues . . . that the milk won't give us undulant fever . . . and that the meat is free of tapeworms. We are not cautioned, as are travelers in many other parts of the world, against swallowing anything that hasn't been peeled or boiled.

The shrinking ranks of American farmers have done an amazing job in meeting present-day food demands. They could not have produced so efficiently without the effective control over pests of plants and animals that chemical pesticides provide. Without pesticides, we would surely face a bleak harvest this autumn.

I need not remind you of how pesticides contribute to our health and comfort by controlling insects that attack man or transmit diseases to him.

Talk before the Symposium on Pesticides, Food Additives, and Public Health at the 91st Annual Meeting of the American Public Health Association, Kansas City, Missouri, November 11, 1963.

We need pesticides. Their benefits in controlling insects, plant diseases, weeds, nematodes, and animal pests are being realized without grave or undue risk to the public. Cases of misuse or accidents, though occasionally serious, compare favorably in number with those caused by many common household substances which apparently arouse little public concern.

This excellent record is maintained despite the great increase in pesticide development and use in the last twenty years. It is due in part to the Department's emphasis on the need for using these toxic materials with the greatest care. We are constantly on the alert to find ways of improving the safety of pesticide use.

Today, I want to outline briefly how the Department carries out its responsibilities in this field, and how we're putting into effect the recommendations of the President's Science Advisory Committee for strengthening our work. That Committee, as you recall, set up a Panel which reviewed and reported on the use of pesticides in this country.

One Department responsibility is to conduct research to develop better methods of providing protection against pests.

Chemical pesticides have long been the main weapon, and USDA has had a big hand in developing them, in cooperation with industry and the State experiment stations. In this work, we have always been concerned about avoiding any harmful effects from pesticides.

For example, Department scientists were among the first to recognize the problem of insecticide residues in meat and milk in the late 40's. To resolve this problem, a determined cooperative effort was made to develop alternate materials that would not be stored in milk or meat or persist in animal tissues. A major shift of research emphasis to develop control methods that would leave no chemical residues was begun in 1955 -- eight years ago -- in response to the growing resistance of insects to chemicals as well as the occurrence of low-level residues.

Today, two-thirds of our total research effort on insects is devoted to such matters as biological control, highly specific chemicals, and studies of a basic nature.

The President's Committee believes we should continue and strengthen this shift away from research on broad spectrum chemicals. We have requested supplementary funds to expand work on biological control methods, the development of more specific chemicals, and more sophisticated methods of use that will avoid residues and adverse side effects.

Our scientists have made many important contributions in devising effective cultural practices as well as in breeding crop varieties that resist damage by various pests. USDA pioneered in biological control -- fighting pests with their natural enemies. We believe such methods hold further promise.

Our scientists are also developing imaginative new approaches.

One of the most spectacular is to sterilize insects sexually and release them to promote their own destruction. Use of this approach has already freed the southeastern United States of the screwworm. The job was done by raising millions of screwworms, sterilizing them with radioactive cobalt, and releasing them in overwhelming numbers to mate with the native flies. A program to eradicate this destructive livestock pest from the Southwest has already achieved a dramatic amount of control there.

Use of this concept -- sterilizing the pests either with gamma radiation or with chemicals -- opens up the possibility of helping to control such common pests as the boll weevil, the codling moth, the housefly, and even the tsetse fly, which carries devastating sleeping sickness to man and animals in Africa.

Other interesting approaches to insect control are based on the attraction of insects to host plants and animals, to the opposite sex, and to lights, sounds, and other types of radiation.

With such varied weapons at hand or on the way, our scientists are talking more and more about combining biological, chemical, and physical methods for an integrated approach to pest control. Such custom-made combinations can result in well-balanced programs not entirely dependent on any one control method.

In all our research, we are seriously handicapped by lack of fundamental knowledge about the organisms and materials we are dealing with. So, as rapidly as possible, we are expanding basic investigations in such areas as the actions of pesticides in soils, crops, and livestock, and the life processes, biology, and behavior of insects.

Research in half a dozen modern, well-equipped laboratories -- recently completed or almost finished -- should accelerate our development of safe, new pest-control methods.

Another broad and important responsibility assigned to USDA is to regulate the marketing of all the pesticides sold interstate in this country.

In reviewing registration under the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, scientists of the Department pass on the effectiveness and safety of a tremendous variety of products. They range from insecticides for mosquitoes to herbicides for cotton . . . from fungicides for wood to sterilizers for surgical instruments.

To protect the public from potential hazards, USDA requires the manufacturer to submit exhaustive data on any new pesticide offered for registration. There must be detailed and convincing test results showing that the product will give effective pest control under a variety of conditions. Extensive toxicological studies are required to convince us that the precautions on the proposed label, if followed, will be adequate to safeguard the public. And when the product is used on food or feed crops, detailed chemical

analyses of any residues must be submitted to show that they are within legal limits.

This information is evaluated by a highly competent staff of ARS scientists. In addition, we consult on questions of safety with expert authorities in other scientific institutions and Federal agencies, such as the Food and Drug Administration, the Public Health Service, and the Fish and Wildlife Service.

The Department keeps this registration process under continuing review in the interest of safety. USDA took the initiative in proposing the legislation that established these safeguards back in 1947. We cooperated in extending their coverage to additional materials in 1959. And we have now recommended that the law be tightened up by eliminating a provision that permits an applicant to go ahead and sell his product by registering it "under protest" when registration has been denied by USDA.

Precautions to avoid or minimize injury to fish and wildlife are a significant part of the registration requirements. We are giving more attention to these requirements.

Recently, the Department asked a number of outstanding specialists to look over our registration operation and help us determine what changes, if any, need to be made to fully protect the public. This group included representatives of Federal agencies, State Departments of agriculture, and the consuming public.

The views of this group were of great help to the Department in framing the recent proposals to improve the registration of pesticides. These proposals require that key warning and caution statements be prominently placed on the front panel of the label. This information must be printed in legible type, and written so it's easy to understand. We've also recommended to the Congress that the USDA be given authority to require that the registration number be shown on the label, so that the buyer can tell whether he's getting a Federally regulated product.

The Department carries out still another important assignment that involves pesticides. Along with cooperating States, we directly combat several of the most dangerous pests that threaten this country.

Unfortunately, there is a serious lack of public understanding of the need for such protection of our food, fabric, and timber resources.

Experience has proved that we must maintain a strong line of defense at our air, sea, and border ports of entry against foreign agricultural pests . . . that it pays to eradicate a pest when we can, rather than try to live with it . . . and that we must try to hold down losses by confining and controlling some pests until research can give us the more effective and safer weapons needed for eradication. These measures not only help maintain efficiency in production but also greatly reduce the use of pesticides in the long run.

Cooperative campaigns are now being waged to eradicate or control 23 crop pests, 12 pests of livestock, and some 20 pests of forests.

Naturally, such programs often call for the use of pesticides. In using them, we give safety full consideration. Operations are planned to minimize any danger to workers, people living in treated areas, crops, livestock, fish, and wildlife.

Leaders of these programs are now rechecking field instructions to make sure they are adequate. Pesticide safety officers have been appointed in USDA pest-control activities throughout the country. Workers have stepped up pilot-testing of selected insecticides that might possibly replace more persistent types of chemicals.

The Department, within the resources available to it and in cooperation with other Federal and State agencies, has been monitoring the effects of our control programs on beneficial organisms in the environment. Funds have been requested to expand this activity and to go into it in more detail, as a guide to future operations.

All USDA pest-control campaigns are under continuous review by the new Pest Program Evaluation Group established within the Department. This Group determines whether any program needs to be modified in any way, and makes sure that no possibility for improvement is overlooked.

These measures reflect a long tradition of concern for safety in USDA. The Department took the initiative in the 1940's in establishing the Interdepartmental Committee on Pest Control, and again -- more than two years ago -- in establishing the Federal Pest Control Review Board. That Board reviews plans for all pest-control programs carried on by the Federal government. The result is that these programs are conducted with due consideration for every national interest, including agriculture, public health, and wildlife conservation.

In addition, USDA has initiated meetings with the Interior Department and the Department of Health, Education, and Welfare to define areas of interest and to provide for greater cooperation, coordination, and consultation in exchanging information.

These, in brief, are some of the ways the Department is helping to protect the public against possible hazards.

However, so far as private use of pesticides goes, Federal controls operate only up to the point of sale of a product. Scientists may experiment, test, and retest; members of Congress may legislate; and government agents may regulate . . . but ultimately, the proper use of pesticides is in the hands of the individuals who apply them.

USDA has stressed this point for years. The Department never recommends a pesticide without also emphasizing the precautions to be taken for its safe use. More than a hundred different bulletins and leaflets currently contain such recommendations and precautions. They have gone into more than 30 million copies of popular USDA publications distributed over the past 10 years.

Today, public concern assures a more receptive audience than in the past, and we are reemphasizing the proper handling of pesticides in many ways.

Publications, posters, speeches, press releases, radio, film strips, and television carry the message. I hope you have already seen and heard the spot announcements sent to every TV and radio station in the country. You should see one of the posters in every post office. A new motion picture, "Safe Use of Pesticides," has been produced in cooperation with the Department of Health, Education, and Welfare, and it's available in every State.

The message all these materials carry is a simple one: "Use Pesticides Safely -- Read the Label."

In the future, we in the Department of Agriculture -- like others in public service -- will continue to do all we can to protect our fellow countrymen from hazards of pesticide use in spheres where they cannot protect themselves.

And we shall try to tell the public, as persuasively and insistently as possible, that pesticides and precautions must always go together.

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Jan 22, 1964 THE SAFE USE OF PESTICIDES BY THE COMMERCIAL APPLICATOR

Talk by Dr. Robert J. Anderson, Deputy Administrator, Agricultural Research Service, U. S. Department of Agriculture, before the Fifth Agricultural Chemicals Conference, New Mexico State University, University Park, New Mexico, January 22, 1964.

There's nobody I'd rather be talking to today than you, because we in the U. S. Department of Agriculture share with you a great concern for the safe use of pesticides.

We are in the midst of a campaign now to bring to every user of these needed materials a simple message: "Use Pesticides Safely -- Read the Label." We are doing it through radio, television, newspaper and magazine releases, publications, posters, and motion pictures. And, whenever we can, through discussions such as this.

I need not remind this audience of the part chemical pesticides have played in meeting present-day demands for food and fiber. American farmers could not have produced so efficiently without the effective control these materials provide over pests of plants and animals. I need not remind you, either, of how much pesticides contribute to our health and comfort by controlling pests that attack man or transmit diseases to him.

We need pesticides. However, they demand meticulous care in their use. Many are powerful substances, and some can be extremely dangerous. This also applies to many present-day drugs, chemicals, and machines.

I'd like to talk particularly with those of you who are dealers in pesticides, or commercial pest exterminators, or aerial applicators of pesticides. In your hands lies much of the responsibility for the safe use of agricultural chemicals.

Dealers who sell pesticides are authorities to many customers. Home owners and gardeners -- those who use pesticides in small quantities for a variety of needs -- are particularly likely to depend on your advice as to the right product to buy.

This places a lot of responsibility on you. I am sure you keep in close touch with your county agricultural agent, State experiment station specialists, or other authorities who have the latest recommendations in the pesticide field. Before you choose your materials, you probably also stock up on the many State and USDA publications that recommend the proper pesticides for practically every need. However, we strongly urge that you consult your State Entomologist for specific information on the proper chemical to use.

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You can conduct your own educational program by showing each customer how to make the most of the information on a label. A little straight talk from you may help to prevent accidents.

Teach your customer that he'll get best results by buying a material specifically recommended for the job he wants done.

Carefully reading and following the directions for use and the precautions on the label are essential to safety. Accidents with pesticides that do not involve a violation of these instructions and precautions are extremely rare. Most cases of poisoning with insecticides and other pesticides result from flagrant disregard of safe handling instructions and from gross carelessness in storing these materials.

Anyone handling pesticides should observe every precaution scrupulously. Workers mixing and applying them, however, should be the most careful of all. They are the people most likely to experience frequent exposure from the standpoint both of acute accidental poisoning by concentrates and of possible cumulative effects of repeated exposure to lower concentrations.

This is true despite the fact that the potential hazard of regular exposure to concentrated chemicals is probably highest among the people who manufacture them. Generally, the manufacturers and formulators have the facilities to use well-known protective methods in handling hazardous substances, and work under vigorous medical control. Therefore, few cases of illness occur in this group.

In contrast, similar controls are generally not feasible in the field, and immediate medical supervision is not practical.

Only a commercial operator thoroughly familiar with the chemicals he is using, and fully informed as to their hazards and limitations, should apply pesticides. He should realize the great need for safeguards to protect himself, his employees, the producer of the crop, and the ultimate consumer.

In the present concern about the persistent pesticides -- which includes the hydrocarbons -- there is a great tendency to shift over to the less persistent or non-persistent organophosphates.

In so doing, people may be changing from a chemical with a good record of safety for both user and consumer -- such as DDT and others. Some less persistent ones such as parathion, which is more hazardous for a short while, present more of a safety problem to the applicator. Persistence may not always be a liability, particularly if use of a less lasting material will require repeated applications and therefore increase the chances for accidents associated with handling and application.

The toxicity and persistence of the less stable chemicals may be particularly affected by weathering, temperature, or the addition of such materials as solvents, stickers, stabilizers, or other pesticides. Those who mix and apply chemicals need to be especially alert to the unexpected hazards that may occur when two or more chemicals are combined . . . to the way a solvent can destroy the protective oily barrier of the skin and allow it to absorb a pesticide more readily . . . to the way stickers and spreaders make the active agent stick to more skin more readily . . . and so on.

For example, in Modesto, California, last year, some peach pickers working in an orchard treated with parathion showed mild to moderate symptoms of parathion absorption. (One case of intoxication followed by death from pneumonia was reported, but it is not certain that the picker's death resulted from exposure to parathion.) It appears that combining sulfur, stickers, or stabilizers with the parathion might have retarded that chemical's deterioration beyond the waiting period usually recommended before fruit picking, thus resulting in the pickers' illnesses.

This occurrence illustrates the dangers associated with making even minor changes in formulation of pesticides without having them subjected to adequate research or experimentation. Unrecommended mixtures or witches' brews can present grave problems. Commercial applicators who prepare their own formulations should be constantly aware of the dangers involved, particularly with the more highly toxic pesticides.

As you know, misuse of pesticides is the greatest cause of accidents and damage to man and livestock.

It's certainly not necessary to tell competent applicators all the precautions they should follow in handling and using pesticides properly . . . how to select, store, mix, and apply the chemicals . . . how to calibrate and service equipment for precise and uniform coverage . . . how to avoid or minimize contamination of water and drift to pastures . . . and how to clean equipment after pesticide application. You know the rules more intimately than I.

You also know where the slip-ups can come . . . how protective clothing may be left off in hot or humid weather , . . how prompt washing of exposed parts of the body, and laundering of used clothing, may be neglected . . . how slight changes in timing, weather, or temperature can affect some chemicals . . . and how familiarity can sometimes breed carelessness about taking necessary precautions. Your responsibilities are especially heavy in supervising those who work for you. If a worker can't be well supervised, he should not handle pesticides.

This sounds as if I were saying only YOU can prevent pesticide accidents. I'm afraid that dumping responsibility on someone else isn't that easy.

I'm told that a writer for USDA's Forest Service was once reminded of the dangers of such oversimplifying. As you know, the Service constantly reminds the public how carelessness with such things as cigarettes and campfires can start fires. However, people are not the only culprits; lightning causes more than a tenth of our forest fires. When the writer used this fact on the same page with the slogan, "Only you can prevent forest fires," his editor asked, "Under the circumstances, shouldn't the word 'you' be capitalized?"

Unlike forest fires, pesticide accidents can seldom if ever be blamed on so-called "acts of God." People themselves are usually at fault.

For the safe use of these needed chemicals we all share responsibility . . . the manufacturers and formulators . . . the research organizations that are responsible for developing suitable and safe uses for chemicals . . . the State and Federal governments that regulate the use of chemicals . . . the distributors . . . the commercial applicators . . . the farmers and ranchers . . . and the rest of the pesticide users.

Congress has given the U. S. Department of Agriculture grave responsibilities involving pesticides -- in pest-control research, in pesticide regulation, and in actual control of many pests.

In carrying out these responsibilities, we are now putting into effect the recommendations of the President's Science Advisory Committee for strengthening our work. Last year, this Committee set up a Panel which reviewed and reported on the use of pesticides in this country.

Some of the Nation's finest scientific competence and judgment go into the Department's work in this area. Our highly trained research and regulatory staffs often consult on questions of safety with expert authorities in other scientific institutions and Federal agencies, such as the Food and Drug Administration, the Public Health Service, and the Fish and Wildlife Service. We get help from outstanding specialists in industry, from consumer groups, and from conservationists.

I won't name all the boards, the panels, and the committees through which we get this outside help. But I can assure you that we work constantly for greater cooperation, coordination, and consultation in exchanging information in this highly complex and controversial field.

One Department responsibility is to conduct research to develop better methods of protection against pests.

Chemical pesticides have long been the main weapon, and USDA has had a big hand in developing them, in cooperation with industry and the State experiment stations. In this work, we have always been concerned about avoiding any harmful effects from pesticides.

In 1955, we began a major shift of research emphasis in entomology in order to solve growing problems of insect resistance to chemicals and of low-level residues. The President's Committee believes we should continue and strengthen this shift away from research on broad spectrum chemicals. Today, more than two-thirds of our total research effort on insects is devoted to such matters as biological control, highly specific chemicals, and studies of a basic nature. We hope to expand this work.

Scientists have devised effective cultural practices to thwart pests and have bred crop varieties that resist damage by various plant marauders. USDA pioneered in biological control -- fighting pests with their natural enemies. We believe such methods hold further promise.

Our scientists are also developing imaginative new approaches.

Here in New Mexico, you are on the proving ground of one of the most spectacular of these approaches. The campaign to eradicate the screwworm from the Southwest uses the sterile-male principle of eradication -- perhaps one of the few truly original ideas of this century.

Use of this approach has already freed the southeastern United States of the screwworm. The job was done by raising millions of screwworms, sterilizing them with radioactive cobalt, and releasing them in overwhelming numbers to mate with native flies and thus promote the destruction of their kind.

The program here in the Southwest has already achieved a high degree of control of this pest in livestock. I understand that the reduction of screwworms is benefiting wildlife also, as it did in the Southeast. Texas A & M reports wild game more plentiful in that area than it has been for years, with increases in the deer crop estimated as high as 65 percent.

Use of the sterile-male concept -- sterilizing pests either with gamma radiation or with chemicals -- opens up the possibility of helping to control many other pests, including such common ones as the boll weevil and the housefly.

Other interesting approaches to insect control are based on the attraction of insects to host plants and animals, to the opposite sex, and to lights, sounds, and other types of radiation.

Much of this is long-range research. It is not likely to put pesticide applicators out of business any time soon. We will be using pesticides for a long time to come, but we do look forward to using them with greater refinement and precision.

With new and varied weapons at hand or on the way, our scientists are talking more and more about combining biological, chemical, and physical methods for an integrated approach to pest control. Such custom-made combinations can result in well-balanced programs not entirely dependent on any one control method.

In all our research, we are seriously handicapped by lack of fundamental knowledge about the organisms and materials we are dealing with. So, as rapidly as possible, we are expanding basic investigations in such areas as the actions of pesticides in soils, crops, and livestock, and the life processes, biology, and behavior of pests.

Basic research is under way on the physics of fine particles. It employs advanced techniques for detecting, measuring, and analyzing the pesticide deposits that occur on plants. A particle counter . . . a computer . . . spectrographic apparatus . . . and fluorescent materials help the scientist to arrive at basic facts in a short time. Such knowledge should eventually help us to use less pesticide and to develop better apparatus for placing material exactly where it is needed on a crop.

Another broad and important responsibility assigned to USDA is to regulate the marketing of all the pesticides sold interstate in this country.

In reviewing registration under the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, scientists of the Department pass on the effectiveness and safety of a tremendous variety of products: insecticides, herbicides, fungicides, sterilizers . . . and many more. Now under regulation, for example, are the devices and materials you may have to use to keep birds away from New Mexico feedlots.

To protect the public from potential hazards, USDA requires the manufacturer to submit exhaustive data on any new pesticide offered for registration. There must be detailed and convincing test results showing that the product will give effective pest control under a variety of conditions. Extensive toxicological studies are required to convince us that the precautions on the proposed label, if followed, will be adequate to safeguard the public. And when the product is used on food or feed crops, detailed chemical analyses of any residues must be submitted to show that they are within legal limits.

The Department keeps this registration process under continuing review in the interest of safety. Precautions to avoid or minimize injury to beneficial fish and wildlife are a significant part of the registration requirements, and are being given close attention today.

The Department's recent proposals to improve the labeling of pesticides require that key warning and caution statements be prominently placed on the front panel of the label. This information must be printed in legible type and written so it's easy to understand.

We've recommended to the Congress that the registration number be required on the label, so that the buyer can tell whether he's getting a Federally regulated product. We've also recommended that an applicant no longer be allowed to sell his product by registering it "under protest" when USDA has denied its registration.

The State pesticide regulatory officials have been most helpful to us in developing and administering uniform Federal and State regulations governing the sale and use of pesticides. We look forward to still better coordination in this fine working relationship.

There are no Federal laws that require the policing of pesticide users to be sure they comply with instructions for safe use. Some States and cities, however, do require licensing and other regulations of commercial pesticide operators, such as aerial spraying concerns and termite control companies. This type of local regulation may become an increasingly popular way to exert more effective control over large users of chemicals.

Commercial applicators are not required by Federal law to use materials either registered or recommended by USDA, but they would be well advised to do so. Use of unregistered or unrecommended materials can result in a variety of hazards, particularly to human health . . . to seizure of farm products contaminated with illegal residues . . . to increased insurance for commercial operators . . . and to pressure for suppressive legislation.

The U. S. Department of Agriculture carries out still another important assignment that involves pesticides. Along with cooperating States, we directly combat several of the most dangerous agricultural pests that threaten this country. Campaigns are now being waged to eradicate or control 23 crop pests, 12 pests of livestock, and some 20 pests of forests. You are probably familiar with a number of these -- the screwworm eradication program I mentioned earlier, for example, and the successful effort to eradicate from New Mexico and the Southwest the khapra beetle, the world's most destructive pest of stored grain products.

In using pesticides in such programs, we give safety full consideration. Operations are planned to minimize any danger to workers, people living in treated areas, crops, livestock, fish, and wildlife.

We have double-checked the adequacy of our field instructions for these programs, appointed pesticide safety officers throughout the country, and stepped up pilot-testing of alternate insecticides that have minimum toxicity to man and animals. Also, within the resources available to the Department and in cooperation with other Federal and State agencies, we are monitoring the effects of our control programs on beneficial organisms in the environment. This activity will serve as a guide to future operations.

Incidentally, the Department will issue this spring a "Farmers' Checklist for Pesticide Safety" that is based on one prepared for technicians on our control programs. It deals with the care and maintenance of spray equipment, respirators, and other practices. Some of you may find it useful.

All USDA pest-control campaigns are under review by groups inside and outside the Department. This review gives assurance that these programs are conducted with due consideration for every national interest, including agriculture, public health, and wildlife conservation.

We believe that we are doing everything humanly possible to promote the safe use of pesticides. They are subject to more legal controls and regulatory examination than any other product.

In the last analysis, however, the safe use of these chemicals is not a Federal problem or a State problem -- it's in the hands of the user. By keeping informed and informing others . . . by conducting our own operations safely . . . we can make a contribution of lasting value to the health and well-being of people everywhere.

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SAFE USE OF PESTICIDES

Mar. 11, 1964

Talk by Dr. Robert J. Anderson, Deputy Administrator, Agricultural Research Service, U. S. Department of Agriculture, before the annual meeting of the Eastern Plant Board in Boston, Mass., March 11, 1964.

It is a great pleasure to be here tonight among long-standing friends in State regulatory work. Your kind invitation provides a welcome chance to talk about our common problems and to consider how we might solve them.

Ours is a close, cooperative relationship. Ideas and knowledge are always freely exchanged between the States and the Federal government, and each of us supports the other in all State-Federal undertakings.

In this cooperative tradition, I would like to report on some of the recent decisions and moves we have made in USDA to assure the future safe use of pesticides in our agriculture. Safe use of pesticides is just one aspects of the broader question of protection for man and his environment. Let me describe what I think is the relationship between safe pesticides and the overall question of protection.

The problem of safety in the use of pesticides is not new to USDA. The Department has been a leader for many years in developing new, more efficient pesticides as well as improved ways of using them safely. However, the requirements for using pesticides safely were never more demanding than they have become in recent years.

To begin with, we need pesticides to assure our continued abundance of food and fiber. We need these materials to protect our crops and livestock. But we must also protect people -- ordinary consumers, farmers, gardeners, agricultural workers, and food handlers -- to name some of the most vulnerable. Not only must we protect people but we must shield our environment from toxic hazards -- our fish and wildlife, our soil and water, our useful insects, and other natural resources.

Protecting our total environment is today's requirement. Nowadays, we acknowledge the importance of protecting this total environment. Our acknowledgment comes at a time when the remarkable development of new pesticides has increased the need for using these materials with added care.

The urgency of this need for protection was clearly recognized in the report on pesticides, last May, by the Life Sciences Panel of the President's Science Advisory Committee. The Panel made some very valuable recommendations to improve protection for our environment and the safe handling of pesticides, and USDA is now moving ahead with plans to implement these suggestions. I would like to tell you about these plans.

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First, to bring you up to date on proposals, currently being processed, to tighten up our agricultural pesticide regulations:

As you know, one of the Department's major responsibilities in this area is to administer the Federal Insecticide, Fungicide, and Rodenticide Act. Under it, we register all pesticides sold interstate.

Under the Act also, USDA requires manufacturers seeking registration of a new pesticide to submit data supporting their claim that the compound is safe and effective for the purpose intended ~~men~~ used according to label instructions and warnings. There must have been toxicological studies to show that the precautions proposed for label warnings will protect the public adequately.

There is much more to pesticide registration. For example, if the proposed pesticide leaves residues on a food crop, we delay registration until the Food and Drug Administration has established safe tolerances on the proposed new material.

Because of our detailed requirements, three to five years of exacting scientific work are needed to assemble satisfactory proof of safety and effectiveness. The assembled information is then evaluated by the Pesticides Regulation Division of USDA's Agricultural Research Service. During these evaluations, our people consult constantly on questions involving safety with authorities in other government agencies, private scientific institutions, and State agricultural experiment stations. Thus, the accuracy of our own knowledge is continually being subjected to the test of outside judgment.

The protection afforded by this careful preparation is extended by means of the strict control we maintain over all labels used on pesticide containers. We review carefully the wording of a proposed label and satisfy ourselves that it gives adequate instructions for safe and effective use.

Recently, we proposed changes in the regulations affecting the labels. The changes, in our estimation, would improve the protection to consumers and the general public. The proposed changes have already been published in the Federal Register and, we hope, will soon be in effect.

The changes would eliminate certain safety claims now allowed on labels, require additional precautionary information on the label's front panel, and require also prominent display of information about the hazards of using a particular pesticide.

This kind of improvement in our pesticide regulations can be brought about by administrative decision. More far-reaching changes depend upon Congressional action.

In this category is a recommendation we have made to tighten up another part of the registration process for increased pesticide safety. This would eliminate the present provision in the Federal Insecticide, Fungicide, and Rodenticide Act allowing a manufacturer to demand that his product be registered "under protest" after his request for registration has been initially denied.

A bill to eliminate the provision in question has already passed the House and is awaiting Senate action. This bill contains another safety measure of interest. It would require that all pesticides carry a registration number on the label, so that the toxic ingredient could be quickly identified.

Actually, four bills covering these two points were introduced into the Congress. They are all practically identical. In USDA, we have heartily supported the so-called Ribicoff Bill, S. 1605, and recommended its enactment with only minor changes in language for clarity and better administration.

We are looking in another direction with our plans for increasing safety. This is toward developing methods of monitoring pesticide use in the Federal-State cooperative control programs, a subject which should be of keen interest to this audience.

Today, we have cooperative campaigns underway to control or eradicate 23 crop and 12 livestock pests. Matters of safety and protection are of the utmost importance in these campaigns. Operations are designed to protect workers, people living in treated areas, nearby crops, livestock, and beneficial fish and wildlife. Procedures must also be safe for anyone coming into contact with residues of a chemical used.

The President's Science Advisory Committee observed that: "Federal programs should be models of correct practice for use in the guidance of States, localities, and private users. They should, therefore, be conducted not only with attention to maximum effect on the target organisms but with further evaluations of the associated hazards."

This outlines precisely the position of ARS in pesticide safety and monitoring. One of the most important recent developments has been the formal establishment of a pesticide monitoring program. Monitoring is being coordinated by a technical group within the Plant Pest Control Division of the Agricultural Research Service. Monitoring officers have been named to supervise work in various areas of the United States.

The aim of the program is to assure high performance standards and adherence to safety on all cooperative pest programs in which substantial amounts of pesticide are used.

Monitoring of each program will be planned on an individual basis because pest control programs and the environments in which they are conducted differ so greatly. Specific procedures being developed will provide maximum protection to public health, to personnel conducting pest control work, to livestock, fish, wildlife, soil and water, and will furnish us with accurate data on residues.

The Congress appropriated \$125,000 to support this work which is already under way.

We have two contracts with State agencies in Michigan which demonstrate the type of work that will be routine as monitoring of pest control programs moves into high gear.

Under one Michigan contract, State workers are determining the effects, if any, of sprays used for Japanese beetle control on soil and water adjacent to target areas. Under the other contract, State workers are finding out the effects of Japanese beetle sprays on birds, fish, game, and other small mammals, as well as beneficial insects.

In our overall plans for monitoring pest control campaigns, we have carefully considered the importance of close liaison with other Federal agencies. This brings me to another subject of direct interest to regulatory officials.

To meet the need for close cooperation, we have developed what we call an Area Contact organization. This is composed of field representatives of various Federal agencies. The Area Contact group is simply a mechanism by which Federal field officials can meet and exchange information on matters of mutual concern.

Our experience in the gypsy moth campaign last year on Cape Cod here in Massachusetts illustrates the way the Area Contact organization works. Our field people on Cape Cod met with field representatives from the Interior Department and detailed our plans for moth control work. The Interior officials have the responsibility of protecting the new national park lands on the outer Cape and welcomed the opportunity to be sure that wildlife and conservation interests would be protected.

We have already formalized contacts of this type. Our plan has a good precedent. As you may know, USDA in 1961 initiated action to establish the Federal Pest Control Review Board, a group that must approve all pest control programs carried on by any Federal department or agency. Serving on the Board are representatives from the Agriculture, Interior, and Defense Departments as well as from the Public Health Service and Food and Drug Administration of the Department of Health, Education, and Welfare.

So far, I have reported on proposed changes in our regulations, our plans for monitoring pesticide use, and for developing an Area Contact organization.

Now let's turn our attention to the research USDA and its cooperators are doing to develop improved methods of protecting man and his environment against pests. Research is the oldest of the Department's responsibilities in regard to pesticides. And I believe that research will ultimately provide us with the weapons for protection that are entirely safe and more effective than any we now have.

The President's Science Advisory Committee recommended that government scientists continue to shift emphasis from studies of broad spectrum chemical pesticides to research on non-chemical concepts of control, selective methods of applying chemicals, on non-persistent pesticides, and pesticides specific only to a target.

We in USDA are proud to point out that we began this shift in emphasis away from research on conventional pesticides more than eight years ago.

We would like to point out that the Department has always been concerned about avoiding any harmful effects from chemical pesticides, although admittedly they have been the main weapon in the fight against pests.

For example, USDA workers were among the first to recognize the problem of insecticide residues in meat and milk. This was in the late 1940's. To resolve this difficulty, a determined cooperative effort was made to develop alternate materials that would not leave residues in milk or persist in animal tissues.

Consequently, two-thirds of our present total research effort on insects is aimed at finding ways to control insects biologically, developing highly specific chemicals, and studying the life cycles of pests in the hope of being able to interrupt these cycles on a mass scale.

Still further, we are looking for sex attractants to lure pests to their death, for applications of the male sterile technique in insect control, for parasites and predators of pests, and for specific baits. We have high hopes, too, for using physical means of control -- light traps and similar devices -- and, we know that one of the best weapons of all is continued development of insect-resistant crop varieties.

The new research emphasis is likely to continue well into the future. Evidence is provided by construction of new laboratories such as the one currently being finished at Fargo, North Dakota, which will house workers interested in the metabolism of pesticides in insects, plants, and animals. Another laboratory planned for Columbia, Missouri, will stress utilization of biological agents for insect control.

Our accomplishments are not all in the future, however. I need not remind this audience of how successful application of the male sterile technique has proved in certain of our cooperative pest control programs. For example, a highly successful State-Federal campaign in the Southeast several years ago resulted in eradication of the destructive screwworm fly from that region. We are now well on our way to eradicating the same livestock pest from a much larger area in the Southwest.

Using the same technique, we also successfully eradicated the melon fly from a small island near Hawaii.

In these campaigns, insects are reared in great numbers in captivity. In the larval form, they are exposed to radiation which sterilizes the males. Eventually, the adults are released from aircraft over a target area. Females in the native population mate unproductively with sterile males. Continued distribution of sterile males eventually wipes out the native population of a species.

Our studies of the sterile technique applied to species other than screwworm and melon flies encourage us to think that other pests may be attacked in the same way.

In addition, we are testing the possibility of inducing male sterility in some insects through use of chemo-sterilants. These chemical substances would either be fed to the insects in a bait or sprayed on them. Already, we have found chemicals capable of making male house flies sterile, and scientists are at present trying to determine the dosage needed for effective mass sterilization of this pest.

Male sterility -- induced by either chemicals or radiation -- opens up the possibility of helping to control such common and destructive pests as the cotton boll weevil, the codling moth, and the dreaded tsetse fly in addition to house flies.

Another interesting approach to pest control is based on the attraction of insects to light, sounds, the opposite sex, a food supply, or to host plants and animals. Attractants have proved successful for quite some time as a survey tool against the gypsy moth and the Mediterranean fruit fly. Now, we are trying to isolate certain specific attractants and make them synthetically so they can be used against the pests we want to destroy.

An experiment conducted on the Pacific island of Rota illustrates the potential value of attractants. There, scientists impregnated small squares of fibreboard with an insecticide plus a powerful sex-attractant called methyleugenol which can draw Oriental fruit flies from as far as a half-mile away. So effective was this combination treatment that virtual eradication of the fruit fly was accomplished during the tests.

The new look in research is evident, too, by examining for a moment what is happening in our studies relating to a single commodity--tobacco. Here, we are striving, above all, to control tobacco pests by means that leave no residues on the plants.

As a result, between 1959 and 1963, about 80 percent of our research effort on tobacco insects was devoted to biological and cultural control, evaluation of light traps to control hornworm, attractant research, and studying the possibility of using the male sterile approach. During the five years previous (1954 to 1959), only 50 percent of our tobacco insect research was devoted to developing means other than chemical pesticides.

Let me say a word now about predators and parasites as a means of biological control. Our scientists scout abroad continuously for insect enemies of pests, parasites that lay eggs in the body of a pest, or bacteria, fungi, or viruses capable of destroying pests.

The reason they have to search abroad for this type of ally is that so many pests are introduced species. In fact, most of major ones among the 10,000 injurious insect pests that attack crops, forests, livestock, and property in the U.S. have been brought here from abroad.

About 500 of these predators and parasites have been brought back to the United States. In spite of some striking successes with this type of ally, fewer than one-fifth of the 500 imports have been established successfully here. Although regarded as extremely important in the fight against pests, predators and parasites are considered only one weapon among many needed for total elimination of pests.

I want to stress here that we feel that a many-sided approach to pest control is the best policy. I have already listed a variety of approaches that we are taking in our research. We are still much interested also in the important traditional lines of research. By these I mean improved cultural practices to protect crops without resorting to pesticides, to crop breeding work where we are developing varieties resistant to damage by pests, and to the search for new insecticidal materials that are safer and less persistent than any we have at present.

We are not neglecting these approaches even as we broaden the research attack to include new and imaginative ideas.

USDA is not alone in its efforts to improve protection and safety in use of pesticides. Several Members of Congress have a deep interest in the subject and have introduced bills designed to support various suggestions of the President's Science Advisory Committee.

I have already mentioned the Ribicoff bill and the other three House bills that would eliminate the "under protest" registration of pesticides and require identification of economic poisons with registration label numbers.

Three other bills call for amendments to existing legislation protecting fish and wildlife from pesticides. They are H.R. 5588, introduced by Congressman Conte of Massachusetts; H.R. 4487 by Congressman Dingell; and S. 1251 by Senator Neuberger of Oregon.

Department officials believe that action on these bills should be withheld until USDA has had time to carry out recommendations made by the Science Advisory Committee which we feel will accomplish the purpose of the three bills.

Let me make my meaning clear by considering the intent of H.R. 4487:

This bill would authorize the Interior Department to study chemicals proposed for use as pesticides to determine whether these chemicals would be hazardous to fish or wildlife. Interior would then advise USDA how injury to fish and wildlife could be avoided or minimized. USDA would, in turn, put such information on the label for the pesticide container.

Our feeling is that preliminary moves have already been launched to guarantee the necessary cooperation and consultation among various Federal agencies with an interest in pesticide protection and fish and wildlife. We think it is best to wait until present measures have been proved inadequate before passing additional legislation.

Three other bills being considered would provide for advance consultation with the Fish and Wildlife Service as well as State wildlife agencies before any Federal programs are undertaken involving use of pesticides or chemicals for mass biological control.

The bills I am now referring to include H.R. 5589 introduced by Congressman Conte; S. 1250 by Senator Neuberger; and H.R. 2875 by Congressman Dingell.

Although we welcome prior consultation on pest control programs, we feel that these bills do not serve this objective satisfactorily. They do not provide for consultation with the Food and Drug Administration, for example. Nor do they provide a chance for other departments to consult with USDA.

Another bill -- H.R. 7353, introduced by Congressman Fogarty of Rhode Island -- requires that persistence levels of pesticides after use conform to certain standards. This bill would assign to the Public Health Service the responsibility for studying the persistence of chemicals.

USDA officials feel that this bill should also be withheld. Many factors are involved in determining the safety of pesticides. Persistence is only one of them. In some situations, in fact, persistence can be a highly desirable quality. We feel that the Fogarty bill does not adequately consider all these factors.

I wish to close my remarks tonight with a last word of appreciation for the cooperation that has always characterized our State-Federal undertakings. We have come to believe in each other over the years and in our ability to solve major regional and national problems in a spirit of mutual respect.

Another major challenge now faces us in this urgent need to improve our protection through safe use of pesticides. Field workers in this effort will be called upon to assume great responsibilities. Double checking every possible danger from pesticide use will demand exacting technical skills. No plans for ultimate victory in the battle against destructive pests are better than the skill of the field workers who carry them out.

The same high standard of cooperation that has always prevailed in our work together will carry us through to success once more.

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PESTICIDES AND AGRICULTURE

Talk by Dr. Robert J. Anderson, Deputy Administrator, Agricultural Research Service, U. S. Department of Agriculture, before 7th CDC Biennial Veterinary Conference, Atlanta, Georgia, August 7, 1964

It's always good to be among old friends. I'm especially glad for the opportunity of talking to you about some of the difficult and sensitive problems that agriculture faces in the growing use of pesticides. This is of concern to you as veterinarians constantly called upon to provide advice, guidance, and instruction in the safe and proper use of pesticides . . . and as consumers interested in the welfare and future of American agriculture.

You all know that pesticides are a major ingredient of today's modern technology. Without them, production of crops and livestock would be curtailed and the quality of farm products would be lowered. There would be large losses in quantity and quality of food products in marketing and storage, and consumers would probably pay higher prices for poorer products. Production of timber would be reduced and buildings and other structures in which wood products are used would be damaged. Inability to control pests could create serious hazards to human health and welfare. The level of living that we all enjoy would be reduced.

It's true, of course, that these pesticides are powerful substances, and, if misused, can be harmful to man, animals, plants, wildlife, and beneficial insects. The Department of Agriculture recognizes these dangers, just as it recognizes our dependence upon these chemical materials. The only solution to this dilemma is through a great expansion of pest-control research, an intensified education effort on proper use of these materials, and a strengthening of pesticide regulations at all levels of government.

Only a few weeks ago, the President, acting upon the recommendation of the Secretary of Agriculture, asked Congress for an additional \$29 million to intensify our work in these areas. We feel this will speed up the development of new and improved pesticides that can be used with the greatest efficiency and safety . . . as well as techniques for controlling pests that require minimum amounts of pesticidal chemicals or none at all.

In the meantime, however, we face some rather critical problems that demand immediate solutions. The most baffling are those associated with the concepts of "zero tolerance" and "no-residue" registration. The strict application of these concepts in the use of pesticides on food crops is making some farmers inadvertent offenders of the law and making it difficult for the Department to make recommendations based on current knowledge that won't be outdated in a short time.

Let me give you some of the background on this situation:

The labeling and marketing of pesticides in interstate commerce is, as you may know, governed by the Federal Insecticide, Fungicide, and Rodenticide Act. After a new pesticide has been developed in an industrial laboratory, an application is submitted to USDA asking that it be registered for use. If the compound is not to be used on a food crop, USDA reviews the experimental data submitted with the application. The compound is registered if it is found that there is no undue hazard to man and domestic animals . . . and if convincing evidence has been submitted to prove that the product is safe and effective for the proposed use when applied according to label instructions.

If, however, the pesticide is proposed for use on food crops, the application for registration must list each crop on which it is to be applied, and must present analytical data on residues and toxicity.

The information is studied by scientists of the Pesticides Regulation Division of the Department's Agricultural Research Service. If it can be proved that the product leaves no residue on a particular crop when used as directed, the compound is then registered for use on a no-residue basis. But if the compound leaves a residue, USDA delays registration until an adequate residue tolerance has been established by the Food and Drug Administration.

The procedures to be followed in establishing tolerances are outlined in Public Law 83-518, often referred to as the Miller Bill. This bill is an amendment to the Federal Food, Drug, and Cosmetic Act, which is administered by the Department of Health, Education, and Welfare.

So far, some 60,000 pesticide products, utilizing about 600 active chemicals, have been registered. About two-thirds of these products have been accepted for use on raw agricultural commodities. Over 6,000 such uses are registered and more than half are on a "no-residue" basis.

The no-residue registrations are logical enough, since the Miller Bill deals only with means for evaluating the safety of known residues. When pesticides are used so no residues are left on a crop, there are no provisions for establishing tolerances. In the absence of a finite tolerance, there is an automatic zero tolerance.

So it was that many valuable uses for a large number of pesticides were registered on the basis of perfectly valid proof that there would be no residues when the directions -- an absolutely integral part of the registration application -- were followed.

Now, two things have recently happened to create confusion and cast doubt upon the logic of both the "zero tolerance" and the "no-residue" registration.

The President's Life Sciences Panel report of May 15, 1963 concluded that the experimental evidence on which many older tolerances were based was inadequate, and recommended that such tolerances be reassessed. This has already been started by the Food and Drug Administration.

The development of increasingly sophisticated methods of analysis has rendered the "no-residue" and "zero tolerance" concepts almost meaningless, because the levels of detection are constantly being lowered by these new methods. Chemists can determine residues at fantastically low levels -- in parts per billion or even trillion -- whereas a couple of years ago residues were measured in parts per million. With such methods of detection, it has become almost impossible to use a product today without leaving some measurable residue.

In a number of recent instances, farmers have applied a given pesticide in good faith, in accordance with current instructions, only to find their products subject to seizure because a previously undetectable level of residue has been discovered, no matter how infinitesimal or insignificant in terms of human health.

This was the situation in Washington, D. C. recently when new and highly sensitive testing procedures revealed traces of heptachlor and dieldrin in milk from some farms in Pennsylvania and Maryland. The insecticides had been applied -- according to registered and recommended use -- to alfalfa which was later fed to dairy cows. Yet, in view of the zero tolerance, when residues of heptachlor and dieldrin were found in alfalfa and in milk, we had no choice but to cancel registration for forage use of both chemicals.

Recognizing the seriousness of this problem, the Secretaries of Agriculture and Health, Education, and Welfare recently joined in a request to the National Academy of Sciences-National Research Council that a committee of distinguished scientists be established to review the entire problem of "zero tolerances" and "no-residue" registrations.

The Academy has agreed to undertake this study and we should have its recommendations by the end of this year.

The matter involves the significance of trace residues and whether or not they should be judged illegal just because they can now be found by improved analytical methods, and whether or not such trace residues should be deemed unsafe to the degree that immediate withdrawal from the market should be demanded. We hope that the Academy studies will provide modern and reasonable guide lines for both farmer use and regulatory action.

In the meantime, the Departments of Agriculture and Health, Education, and Welfare have agreed to inform each other of actions taken on pesticides. The Food and Drug Administration will notify Agriculture of any proposed tolerance or exemption from tolerance, and will exchange data on residues. In this way, changes that may be needed in the registration procedure because of improved methods of detection or re-evaluation of various hazards, can be made early enough to reduce the danger of seizure action by the Food and Drug Administration.

As you can see, the overwhelming problem . . . the thing that we are most deeply concerned with in the field of pesticides . . . is safety. Safety for man and his crops and livestock as well as for all forms of wildlife.

The Federal Insecticide, Fungicide, and Rodenticide Act provides the primary protection against the hazards of pesticides.

Additional protection has been provided by an amendment known as Public Law 88-305, effective on May 12 of this year. Under this Act, an applicant no longer has the right to demand that the Department register his product under protest -- after an open registration has been denied -- and then sell it to the public. The Act also authorizes the USDA to require that registration numbers be displayed on pesticide labels.

Significant added protection is also provided by a recent revision of the Department's registration procedures which require stricter labeling on pesticide containers. Warning and caution statements must be prominently displayed and easy to read and must draw the user's attention to the need to handle the material carefully.

In addition, the Department has issued numerous publications informing farmers how to use pesticides for the greatest safety and effectiveness. Up-to-date information is being given to farmers constantly through the State Extension Services and other State agencies.

Several bills pending before Congress could have the net result of further protecting the Nation's consumers. Recently introduced legislation provides for factory inspection of pesticide manufacture, for civil penalties in case of violations of prescribed rules of safety, for authority to enforce compliance, and for permits for disposal of pesticide wastes.

A recently formalized agreement of the Agriculture, Interior, and Health, Education and Welfare Departments will provide for still additional protection. Each Department will keep the others fully informed of developments from research or other information that may come into its possession. Along with this formal agreement, we intend to continue the long established informal working arrangements between our scientists and those of the other Departments.

Moreover, we have given new emphasis to safety as the major consideration in our cooperative pest-control programs. We plan our operations with the greatest care to protect the people who do the spraying; those who live in the treated areas; the crops, livestock, fish, wildlife; and anyone who comes in contact with residues, if any, of the chemicals used.

All the Department's pest-control campaigns are continuously reviewed by the USDA Pest Program Evaluation Group to make sure that the safest and most effective materials and procedures are used. Further, the Federal Committee on Pest Control, formerly known as the Federal Pest Control Review Board, considers and passes on each pest control program planned by any government agency.

In still another move to insure greater protection, the Department has set up a pesticide monitoring system to determine if any significant environmental hazards are resulting from normal agricultural uses of pesticides. Scientific teams are taking samples of soil, silt, runoff, water, wildlife, crops, other plant life, and fish to determine if any residues are present . . . and observing any possible adverse effects. USDA is cooperating with the State Departments of Agriculture in this effort, and coordinating with other Federal agencies.

Undoubtedly, the ultimate solutions to the problems of protecting our food and health against pests will come through research. This is a major story in itself. It is sufficient to say here that our research efforts have increased greatly through the years in response to growing needs for improved methods of controlling pests. Some of the finest achievements in the Department's century of service to the American people have come out of this kind of research. The discovery that DDT was effective in controlling the malaria mosquito is a classic example.

We are, of course, still trying to work with industry to develop new and improved pesticides that can be used with a greater degree of safety and effectiveness. But the major share of USDA research today is on the development of alternate means of pest control -- including biological control, insect sterilization, attractants, repellents, and various mechanical techniques. We are exploring every avenue, every possibility -- however remote -- in an effort to come up with sound, practical ways to control the pests that take such a heavy toll of our farm production.

As Public Health veterinarians, you can understand the urgent need for pesticides, as well as the measures that must be taken to protect against environmental contamination with these useful chemicals.

Because you are in a position to use this understanding to good advantage, let me urge you to help put across the message of safe use of pesticides at every available opportunity -- every time you talk to a farmer . . . every time you talk to local groups . . . every time you meet with private practitioners who advise farmers . . . in fact, in all of your day-to-day contacts with all segments of the public. Don't preach fear, but emphasize sanity in the handling, storage, and use of pesticides.

We will find public support and appreciation for pesticide use in agriculture and our cooperative pest control programs only as the public understands all the facts, including the dangers, and how to guard against them. As veterinarians . . . as representatives of government, it is our responsibility to be fully informed ourselves, and to inform others.

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Talk by Dr. Robert J. Anderson, Deputy Administrator, Agricultural Research Service, U. S. Department of Agriculture, before the National Association of State Departments of Agriculture, University Park, New Mexico, August 24, 1964.

I am glad to have the opportunity of meeting with you during your National Convention this year. It gives me a chance to see many of my good friends and to hear discussions of some of our mutual interests and responsibilities.

I am especially glad to have a chance to talk to you about one of our most difficult and sensitive problems -- the pesticide situation.

To those of you here today who are responsible for agricultural progress in your individual States, the need for pesticides in the foreseeable future will continue. We have no other adequate means at this time to protect the quality and quantity of our food supply -- against pest damage and contamination -- while it is in the various stages of production, marketing, or storage. Without pesticides, production of timber would be reduced, and the aesthetic and recreational value of our forests and woodlands would be seriously impaired. Inability to control pests could create serious hazards to human health and welfare. The level of living that we all enjoy would be lowered.

And, as you well know, farmers would be hit with an economic blight that not only could drive many to the wall, but cause repercussions in the business and industrial segments of our economy as well.

At the same time, we know that these pesticides are powerful materials. If misused they can be harmful to man, animals, plants, wildlife, and beneficial insects. The U. S. and State Departments of Agriculture recognize the dangers no less than our dependence upon these chemical materials.

Through the Federal Insecticide, Fungicide, and Rodenticide Act, we are responsible for helping to assure the safe use and the effectiveness of pesticides shipped interstate. As you know, the Federal requirements under this Act provide a good basis for protection against reckless and haphazard sale of pesticides. However, in view of the growing uses of pesticides for various new purposes and their expanded application in agriculture, we all recognized a need for tightening the law and stiffening the regulations and procedures.

In the past, if the Department denied registration, an applicant could -- and on rare occasions did -- demand that we register his product "under protest." The manufacturer could then sell the product to the public until USDA was able to develop legally acceptable proof to justify a court decision to remove it from the market. In effect the burden of proof was placed upon the Department, and the manufacturer could move and sell a questionable product with impunity until the issue was resolved.

This loophole was closed by Public Law 88-305, introduced and supported by Senator Abraham Ribicoff and signed by the President on May 12, 1964. The new law sets up the mechanism for appeal from USDA decisions, but pesticides may no longer be sold "under protest." The legislation also authorizes the Department to require the registration number of pesticides on the label, so that the buyer can tell whether he's getting a federally regulated product.

We are now requiring stricter labeling on pesticide containers. Warning and caution statements must be prominently displayed and easy to read . . . and must draw the user's attention to the need to handle the material carefully.

In addition, the Department has issued numerous publications informing producers and applicators how to use pesticides for the greatest safety and effectiveness. The most recent of these are on "The Safe Disposal of Empty Pesticide Containers and Surplus Pesticides" and on the ways to "Apply Pesticides Safely by Aircraft." Up-to-date information is being given constantly to farmers through the State Extension Services and your other State agencies.

However, we still face some rather critical problems that have not been solved . . . and that need immediate solutions. The most baffling are those associated with the concepts of "zero tolerance" and "no-residue" registration. The strict application of these concepts in the use of pesticides on food crops is making some farmers inadvertent offenders under the law, and creating difficulties for the Department in making recommendations, based on current knowledge, that won't be outdated in a short time.

Let me review the background on this situation:

When a new pesticide is developed by an industrial company, an application for registration is submitted to USDA. Detailed and convincing test results must be furnished by the manufacturer showing that the product will give effective pest control under a variety of conditions. Findings of extensive toxicological studies must be reported to convince us that the precautions on the proposed label will be adequate to safeguard the public. And when the product is used on foods, detailed chemical analyses of residues must be submitted. Obtaining acceptable proof of safety and effectiveness for a single new basic pesticide, as required by USDA, is likely to take three to five years of exacting scientific work.

The information is studied by the Pesticides Regulation Division of the Department's Agricultural Research Service. If it can be demonstrated to USDA that the product leaves no residue on a particular crop when used as directed, the compound is then registered for use on a no-residue basis, and it may be shipped in interstate commerce. But if the compound leaves a residue, USDA delays registration until the applicant obtains a residue tolerance from the Food and Drug Administration. The

residues may be the chemical itself or other compounds formed after the pesticide has been used.

This responsibility for establishing tolerances has been assigned to the Food and Drug Administration under Public Law 83-518, often referred to as the Miller Bill. It is an amendment to the Federal Food, Drug, and Cosmetic Act, which is administered by the Department of Health, Education, and Welfare.

So far, some 60,000 pesticide products, containing about 600 chemicals, have been registered. About two-thirds of these have been accepted for use on raw agricultural commodities. Over 6,000 such uses are registered and at least half are on a no-residue basis.

The no-residue registrations themselves are logical enough. When pesticides are registered by the Department and used by the producer on the basis that there will be no residues on a crop, there is no requirement that any tolerance be established. In the absence of a finite tolerance, there is an automatic zero tolerance. For example, no finite tolerance for pesticides has been established in milk. Thus, the tolerance for residues in milk is zero.

Many valuable uses for a large number of pesticides were registered on the basis of perfectly valid proof that there would be no residues when the directions -- an absolutely integral part of the registration application -- were followed.

Now, two things have happened to cast confusion and doubt upon the whole procedure.

The President's Life Sciences Panel report of May 15, 1963 concluded that the experimental evidence on which tolerances were based was inadequate, and that many such tolerances should be reassessed. This has already been started.

Meanwhile, and this is our number one problem, the development of increasingly sophisticated chemical methods of detection has rendered the "no-residue" and "zero tolerance" concepts almost meaningless, since the levels of detection are constantly being lowered by these new methods.

Scientists today talk in terms of detecting residues in parts per billion or even trillion, whereas they were once measured in parts per million. In view of such advanced methods of detection, there is virtually no such thing as "no-residue."

The result is that agricultural producers can apply a given pesticide in good faith, in accordance with current instruction, only to find their products subject to seizure because a previously undetectable residue has been discovered -- no matter how infinitesimal or insignificant in terms of human health, as the facts are known today.

This was part of the situation in Washington, D. C. recently when new and highly sensitive test procedures revealed traces of heptachlor and dieldrin in milk from dairy farms in Pennsylvania and Maryland. In some few cases pesticides were misused. But in most of the cases . . . according to the information available to us . . . the farmers followed registered and recommended practices in applying insecticides to alfalfa fed to dairy cows. Yet, in view of the zero tolerance for residues of heptachlor and dieldrin in alfalfa, and the absence of tolerance for residues in milk we had no choice but to cancel registration for both chemicals for this use. The cancellations were also based on recent unpublished research findings which showed that cattle fed heptachlor at the same level as might be expected on or in hay treated in accordance with recommended dosage could leave residues in the milk.

In the meantime, dairy farmers who had fed hay that reportedly met the previous standards were barred from selling milk having the newly detectable residues. They have been compelled to dump their production at losses amounting to many thousands of dollars.

In an amendment to the anti-poverty bill, (recently signed by the President), Congress has authorized the Secretary of Agriculture to make indemnity payments to dairy farmers who have suffered these losses.

As you can well see, the zero tolerance and no residue question is a highly involved and complex matter. To help alleviate the situation now and in the future the Secretaries of Agriculture and of Health, Education, and Welfare recently joined in a request to the National Academy of Sciences Research Council for assistance. They asked the Council to establish a committee of distinguished scientists to review the technical questions relating to the "zero tolerance" and "no residue" problem. The Academy has agreed to undertake this study and we should have its recommendations shortly after the first of the year.

The matter involves the significance of trace residues and whether or not they should be judged illegal just because they can now be found by improved analytical methods, and whether or not such trace residues should be deemed unsafe to the degree that immediate withdrawal from the market should be demanded. We hope that the Academy studies will provide modern and reasonable guide lines for both farmer use and regulatory action.

Another serious problem that we must solve is the effect of pesticides in the general environment. The fish kill in the lower Mississippi River illustrates that point.

Fish kill in this area was first reported in November 1960. Less serious kills were reported in 1961 and 1962. Extensive kills were again reported in November 1963, and the Louisiana State Wildlife and Fisheries Commission requested an investigation by the Public Health

Service. Scientists of this agency concluded that the pesticide endrin was the most likely cause of the 1963 fish kill, but added that they did not determine the method by which endrin and chemically similar aldrin entered the river.

Extensive investigation, hearings, and conferences have shown no substantial evidence that points to the farm use of chemicals as the source of contamination. USDA, therefore, has not withdrawn the registration of endrin, aldrin, and dieldrin for major recommended uses although certain specific uses such as endrin on tobacco and cole crops, dieldrin on clover and alfalfa, and aldrin and dieldrin on potatoes and sugar beets have been withdrawn.

However, USDA has continued to cooperate with the Public Health Service in making surveys to determine if waste disposal or other practices associated with 51 endrin formulating and manufacturing plants along the Mississippi River could be the source of endrin in the River.

We have accelerated the review of all registered uses of endrin, aldrin, and dieldrin and re-examined all recommendations for the use of these pesticides. We have begun an extensive investigation of the Lower Mississippi River Valley pollution program, in cooperation with the States and with the Departments of Interior and of Health, Education, and Welfare.

As a matter of fact, these three Departments have established a formal memorandum of agreement to coordinate all our activities relating to the registration and safe use of pesticides. The agreement, signed by the Secretaries of Agriculture, Interior, and HEW, outlines the specific responsibilities of each department in this field. To implement the agreement, each department has designated a scientist as its representative to review the listing of registration actions pending. This gives us all better opportunities to work together for our common purposes.

Within our own Department, we have given new emphasis to safety as the major consideration in our cooperative pest-control programs. We plan our operations with the greatest care to protect the people who do the spraying; those who live in the treated areas; the crops, livestock, fish, wildlife; and anyone who comes in contact with residues of the chemicals used.

All the Department's pest-control campaigns are continuously reviewed by the USDA Pest Program Evaluation Group to make sure that the safest and most effective materials and procedures are used. Further, the Federal Committee on Pest Control -- formerly known as the Federal Pest Control Review Board -- considers and passes on each pest control program planned by any government agency.

In still another move to insure greater protection, the Department has set up a pesticide monitoring system, from the Gulf to the Great Lakes, to determine if any significant environmental hazards are resulting from normal agricultural uses of pesticides. Scientific teams are taking samples of soil, silt, runoff water, wildlife, crops, other plant life, and fish to determine if any residues are present . . . and observing any possible adverse effects. USDA is coordinating with other Federal agencies in this effort, and cooperating with the State Departments of Agriculture.

We fully understand that you of the State Departments of Agriculture share all of our problems and hopes concerning the pesticide situation. The cooperation in handling these problems by both Federal and State agencies has been excellent and has brought about beneficial results throughout the years. We have learned from and depended upon each other.

We have met problems in the past and, by continuing to work together in the future, I am certain the many issues in this complex problem can be resolved.

At the request of various States, some of our people in USDA have reviewed existing State laws on pesticides. On the basis of this review, we are drafting a proposed State pesticide law, as requested. This would be a pattern for enabling legislation to regulate registration and use of pesticides within State borders.

Undoubtedly, the ultimate solutions to the problems of protecting our food and health against pests will come through research and an intensified educational effort on the proper use of pesticides. This is a major story in itself. It is sufficient to say here that our research efforts in USDA have increased greatly through the years in response to growing needs for improved methods of controlling pests. Some of the finest achievements in the Department's century of service to the American people have come out of this kind of research. The discovery that DDT was effective in controlling the malaria mosquito is a classic example.

We have placed great emphasis on the need to develop new and improved pesticides that can be used with a greater degree of safety and effectiveness. But the major share of USDA research today is on the development of alternate means of pest control -- including biological control, insect sterilization, attractants, repellents, and various mechanical techniques. We are exploring every avenue, every possibility -- however remote -- in an effort to come up with sound, practical ways to control the pests that take such a heavy toll of our farm production.

The Congress is keeping a close observation on the entire pesticide situation, from both a research and regulatory position. Several

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committees in both the Senate and House of Representatives have conducted investigations . . . some of which are rather extensive in scope. Among these committees are the Senate Subcommittee on Reorganization and International Organizations, headed by Senator Abraham Ribicoff of Connecticut; and the House Subcommittee on Natural Resources and Power, headed by Congressman Robert E. Jones of Alabama. Recently the House Subcommittee on Agricultural Appropriations, chaired by Representative Jamie Whitten of Mississippi has started a new investigation of pesticides. The U. S. Department of Agriculture is cooperating with these and other Congressional Committees, which are studying the pesticide problem.

And so in short, the one sure thing you can say about pesticides today is that the situation is fluid. New developments are taking shape rapidly and constantly. As all of you well know, it is sometimes difficult to keep up with the most recent developments, day by day.

Because you are in such a vitally sensitive spot to put your understanding to good advantage, your role is all-important in this ever-changing field. Let me urge you to continue to put across the message of safe use of pesticides at every available opportunity -- every time you talk to farmers . . . every time you talk to local groups . . . every time you talk to people who advise farmers. . . in fact in all of your day-to-day contacts with all segments of the public. Don't preach fear, but emphasize sanity in the handling, storage, and use of pesticides.

We will find public support and appreciation for pesticide use in agriculture and our cooperative pest control programs only as the public understands all the facts, including the dangers, and how to guard against them. As representatives of government, it is our responsibility to be fully informed ourselves, and to inform others.

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CURRENT SERIAL RECORD

THE SIGNIFICANCE OF THE MISSISSIPPI RIVER FISH KILLS

By Dr. Robert J. Anderson, Deputy Administrator, Agricultural Research Service, U. S. Department of Agriculture, before the Entomological Society of America, Philadelphia, Pennsylvania, November 30, 1964.

I appreciate the opportunity of meeting with you here today during your discussion of Current Developments in the Pesticide Field. I know of no other area of responsibility in which agriculture faces a greater challenge in maintaining perspective and balance than in meeting current problems created by the pesticide situation.

We in agriculture must accept the responsibility of providing adequate supplies of high quality food and fiber to support a strong and growing nation. We cannot provide this quantity and quality at today's low prices without the use of pesticides.

Human health officials also have a problem. They must prevent insect-borne diseases such as malaria and yellow fever from regaining a foothold in this country and becoming the scourges they are still in other parts of the world.

Householders and gardeners must protect their families from the contamination and filth that can be brought into their homes without the proper insect control that pesticides provide today.

But we all know that there are certain potential hazards to be reckoned with as long as current pesticides are being used. In that light, I have been asked to discuss the significance of the Mississippi River fish kills.

First, let's review the facts:

Significant fish kill in the lower Mississippi River drainage basin was first reported in November 1960 The lower basin is roughly the area from the northern Arkansas border, south to the Gulf of Mexico Investigations of that 1960 kill by the Public Health Service, Fish and Wildlife Service, and Louisiana Division of Water Pollution Control failed to identify the cause.

Less serious kills occurred in 1961 and again in 1962.

Extensive fish kill was reported in November 1963, and the Louisiana State Wildlife and Fisheries Commission again requested an investigation by the Public Health Service. Scientists of this agency concluded that the pesticide endrin was the most likely cause of the 1963 fish kill, but added that they did not determine the method by which endrin and chemically similar aldrin had entered the water and become concentrated in the fish.

A report of this investigation was furnished the U. S. Department of Agriculture on March 13, 1964, and released to the press four days later, on March 17.

The Department, as part of our regulatory responsibilities in administering the Federal Insecticide, Fungicide, and Rodenticide Act, called a series of public hearings on the matter: at Washington, D. C. on April 9; Memphis, Tennessee, on April 16; and Baton Rouge, Louisiana, on April 23. A total of 84 witnesses appeared at these hearings, representing Federal and State agencies, conservation groups, industry, colleges and universities, and trade organizations.

The results of these hearings, along with other extensive investigations and conferences, have shown no substantial evidence that points to the farm use of chemicals as the source of Mississippi River contamination. Much testimony was received on the benefits derived from the use of these pesticides and the serious consequences for both producer and consumer if the pesticides were removed from the market at this time . . . with no comparable substitute in sight.

USDA, therefore, has not withdrawn the registration of endrin, aldrin, and dieldrin for major recommended uses. But certain specific uses such as endrin on tobacco and cole crops, dieldrin on clover and alfalfa, and aldrin and dieldrin on potatoes and sugar beets have been withdrawn.

USDA continued to cooperate with the Public Health Service to determine if waste disposal or other practices associated with 51 endrin formulating and manufacturing plants along the Mississippi River could be the source of pesticide residues in the River. Survey teams consisting of representatives of USDA, Public Health Service, and the States of Arkansas, Louisiana, Mississippi, and Tennessee, found evidence to suggest that these manufacturing plants might be a significant source of contamination.

The last Congress introduced legislation providing for the investigation and inspection of pesticide manufacturing plants to make sure they are aware of and are using the best and safest methods of waste disposal and other related handling practices. This legislation was not passed before adjournment, but it does indicate a trend in thinking . . . at least among some people.

And so . . . even though no human health problems have been attributed to this situation . . . one of the first significant factors evolving from the Mississippi fish kills is a re-emphasis on tighter security measures for the safe use of pesticides. For example, in the USDA we have accelerated the review of all registered uses of endrin, aldrin, and dieldrin and re-examined all recommendations for the use of these pesticides. We have also given new emphasis to safety as the major consideration in our cooperative pest control programs. We plan our operations with the greatest care to protect the people who do the spraying; those who live in the treated areas; the crops, livestock, fish, wildlife; and anyone who comes in contact with residues of the chemicals used.

All the Department's pest control campaigns are continuously reviewed by the USDA Pest Program Evaluation Group to make sure that the safest and most effective materials and procedures are used. Further, the Federal Committee on Pest Control -- formerly known as the Federal Pest Control Board -- considers and passes on each pest control program planned by any government agency.

We are emphasizing, through educational programs, the need for the safe use of pesticides by everyone who applies them . . . on the farm or in the home and garden. This includes care in selection and application of pesticides; elimination of careless use; avoiding drift on non-target crops, pastures, and other areas.

In still another move to insure greater protection, the Department is cooperating in a pesticide monitoring system to determine if any significant environmental hazards are resulting from normal agricultural uses of pesticides. You will hear more about this system in greater detail later today from Mr. Joe Gentry, who is helping to coordinate the program.

The Department has also intensified our research to find alternatives to conventional pesticides. This is no recent development. Nearly 10 years ago we recognized the necessity of reorienting our research to develop methods that could replace pesticides. . . or be used in combination with pesticides.

Now more than two-thirds of the Department's research effort in this field is directed at developing biological and other highly selective ways of controlling pests and diseases -- along with basic studies relating to such methods.

Earlier research studies led to the development of gamma radiation sterilization of insects. We hope now to find ways to combine attractants with chemosterilants . . . to use light controls . . . and to use pathogens and predators, among other non-chemical methods.

At the same time, another part of our research assignment is clear. We must develop pesticides and application methods that completely avoid or drastically reduce the chance of environmental contamination. This is a necessity because we are convinced that pesticides will continue to have an important place in American agriculture for the foreseeable future.

Ideally, a small quantity of an insecticide should be sufficient to control the target insect without destroying its natural enemies. The insecticide should persist just long enough to control or eradicate the pest. Once the pesticide has done its job, it should readily decompose into products that are harmless to the environment.

Pesticides that approach this ideal are on the market, and their number is growing.

An example is the improved formulation of the insecticide malathion used by Federal and State workers in cooperative grasshopper control last summer. They needed only 8 to 10 ounces per acre, instead of one gallon per acre required with older malathion formulations.

In addition to the need for safe use and handling of pesticides, and for research to develop still safer methods of pest control . . . the Mississippi fish kills illustrate the need for quick and careful investigation of all significant fish kills anywhere they may occur.

In this case, endrin was generally agreed upon as the probably cause of fish deaths -- but not all investigators concurred. And not all investigators agreed on the exact method of contamination of the waters.

We do know that with the new and sophisticated methods of testing for contamination we can detect traces of chemical residues as infinitesimal as one part per million or billion . . . or even one part per trillion. As long as these small traces are detected, pesticides will get the blame for fish kills in the minds of at least some of the people.

On the other hand, fish kills have been occurring in all parts of the world for many years -- long before the use of pesticides became so widespread. Some of these kills are caused by bacterial and viral diseases, extreme changes in temperature, sudden oxygen depletion, salinity of ocean tides moving up river, industrial wastes, sedimentation, effects of chlorination, and many others.

For example, a large fish kill occurred in the Missouri River about May 25-26 of this year. The word went out immediately that the probable cause was pesticides, washed into the river by recent heavy rains.

The Public Health Service made extensive field investigations. The USDA, cooperating with the Missouri State Department of Agriculture, also investigated the kill. Through this cooperative survey, samples of water and fish were taken for laboratory analyses, and observations were made to determine the condition of the Missouri River in search for an explanation of the kill.

The water samples did not contain aldrin, endrin, DDT, DDE, heptachlor, heptachlor epoxide, or lindane. Dieldrin and DDD were present but in concentrations well below those believed to be toxic to fish. Fish samples were negative for toxaphene and dieldrin.

At the time of the fish kill there was an increase in the flow of the Missouri River . . . the greatest part of which probably resulted from direct runoff caused by two heavy rain storms in the Missouri River Valley. Such a runoff would explain the unusually large amount of organic pollution found in the River at the time of the investigation.

Other studies have demonstrated that it is possible to obtain extremely high organic loads with storm water runoff following a prolonged dry spell. The organic pollution produced low dissolved oxygen concentrations in areas of the Missouri River study. It is possible that even lower oxygen conditions prevailed at the time of the fish kill, and it is possible that these conditions killed the fish.

However, the elapsed time between the fish kill and the field investigations prevented observation of dying fish and the accumulation of other essential information. Therefore no definite conclusions could be reached as to the cause of the kill.

And so, it is obvious that there is much we do not know about the causes of specific fish kills. This fact points up the need for continued and ever closer cooperation among Federal, State, and local officials. We must be ready to move quickly and effectively into thorough investigations of any significant fish kill. Time lapse can be a barrier in reaching knowledgeable conclusions and increasing our understanding of these occurrences.

We do know that there are many and varied causes . . . but unless we can prove otherwise, pesticides will likely be suspect. That is why we hope the newly developed monitoring system of the normal use of pesticides in agriculture will give us vitally important new knowledge about exactly what happens to these chemicals in our total environment. With this knowledge, we should be in a better position to reach the conclusions and understanding we need.

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AGRICULTURAL REGULATION OF PESTICIDES

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Talk by Dr. Robert J. Anderson, Deputy Administrator, Agricultural Research Service, U. S. Department of Agriculture, before the Scientists' Institute for Public Information, Chicago, Illinois, December 5, 1964.

I know of no product that is subject to more legal controls and regulatory examination than pesticides. I doubt if some of our common foods could pass the tests we give pesticides to learn their possible effects on human beings.

Congress has assigned to the U. S. Department of Agriculture the responsibility of regulating the marketing of all the pesticides sold interstate in this country. In addition, various State laws require registration in their individual jurisdictions.

The scope of Federal regulation has broadened in the past half-century, and its requirements have stiffened. When the Federal Insecticide Law was enacted in 1910, the chief concern was only to make sure the buyer would get as potent and unadulterated a product as he was paying for. The need to protect people, animals, and food supplies from the hazards of misusing the chemicals themselves became more imperative as time went on.

The 1910 law was supplanted in 1947 by the Federal Insecticide, Fungicide, and Rodenticide Act, which expanded protection of the public and provided coverage of additional types of pest-control materials. In 1959, the Act was amended to include nematocides and plant regulators, defoliants, and desiccants among the materials requiring Federal registration. And a couple of years ago, the definition of the word "pest" was broadened to include practically any organism that at times presents a hazard or annoyance to man and his environment.

Today, therefore, the law also applies to algaecides and to poisons, and repellents for invertebrate animals, amphibians, fish, reptiles, birds, and mammals.

Most of the criticism that has been leveled at pesticide usage in the past few years has concerned insecticides. Certainly most people know by now that our Department has many responsibilities with regard to these chemicals. But not so many realize that USDA regulates the marketing of many other economic poisons that affect our daily lives even more: the materials that keep our kitchens, bathrooms, swimming pools, and hospitals sanitary . . . purify our drinking water . . . make a restaurant's glasses safe to drink from . . . and sterilize the combs and scissors in our barber shops and beauty parlors.

As scientists, you can appreciate the complexity of the decisions our work involves. Hospital germicides, for example, must be strong enough to destroy even resistant staphylococci but safe enough for use around newborn infants. Only scientists can make such decisions -- and on our staff are bacteriologists, pharmacologists, chemists, entomologists, and plant and animal biologists. When they need to, they also consult with scientists in other agencies in making their evaluations.

When a new pesticide is developed by an industrial company, an application for registration is submitted to USDA. Detailed and convincing test results must be furnished by the manufacturer showing that the product will give effective pest control when used as directed. Findings of extensive toxicological studies must be reported to convince us that the precautions on the proposed label will be adequate to safeguard the public. Precautions to avoid or minimize injury to beneficial fish and wildlife are a significant part of the registration requirements. A registration is approved only after stringent standards and requirements for both safety and effectiveness are met.

Recent improvements in the labeling of pesticides require that key warning and caution statements be prominently placed on the front panel of the label. This information must be printed in legible type and written so it's easy to understand. In addition, the Federal registration number will be required on all labels by October 1965, so that the buyer can tell whether he's getting a Federally regulated product.

When a product is used on foods, detailed chemical analyses of residues must be submitted by the manufacturers. Obtaining acceptable proof of safety and effectiveness for a single new basic pesticide, as required by USDA, is likely to take three to five years of exacting scientific work.

The information is studied by the Pesticides Regulation Division of the Department's Agricultural Research Service. If it can be demonstrated to USDA that the product leaves no residue on a particular crop when used as directed, the compound is then registered for use on a no-residue basis, and it may be shipped in interstate commerce.

But if the compound leaves a residue, USDA delays registration until the applicant obtains a residue tolerance from the Food and Drug Administration in accordance with the requirements of the Miller amendment of 1954. In some cases, because of the nature of the pesticide or the way it is likely to be used, a "zero tolerance" is set.

Similarly, if the compound appears to involve a potential hazard to fish and wildlife, we consult with the Fish and Wildlife Service of the Interior Department under a formal memorandum of agreement.

Our registrations are effective for five years and may be renewed at the applicant's request. There is no fee. A registration may be canceled at any time, however, if evidence proves that such action is necessary to protect the public.

Federal inspectors and cooperating State enforcement officials around the country are constantly on the alert for nonregistered, misbranded, or adulterated pesticides. When our tests prove the law has been violated, the product may be taken off the market and legal action taken against the offender.

So far, our Department has registered some 60,000 pesticide products containing about 600 chemicals. About two-thirds of these have been accepted for use on raw agricultural commodities. Over 6,000 such uses are registered, and at least half are on a no-residue basis.

These "no-residue" registrations, along with the "zero tolerance" concept, present a dilemma that we are trying to resolve. The development of new and highly sophisticated methodology in detection has rendered the "no-residue" and "zero tolerance" concepts almost meaningless, since the levels of detection are constantly being lowered. It is also creating difficulties for the Department in making recommendations, based on current knowledge, that won't be outdated in a short time. And there is the constant threat that ever changing standards make some farmers inadvertant offenders under the law.

Recent developments have brought confusion and doubt into this area.

Scientists today talk in terms of detecting residues in parts per billion or even trillion, whereas they were once measured in parts per million. In view of such advanced methods of detection, there is virtually no such thing as "no-residue."

The result is that agricultural producers can apply a given pesticide in good faith, in accordance with instructions based on a registration that predated these sophisticated detection methods. They may then find their products subject to seizure because a previously undetectable residue has been discovered -- no matter how infinitesimal or insignificant in terms of human health that residue may be, as the facts are known today.

In Washington, D. C., earlier this year, new and highly sensitive testing procedures revealed traces of heptachlor and dieldrin in milk from some farms in Pennsylvania and Maryland. These insecticides

had apparently been applied to alfalfa that was later fed to the dairy cows. We have therefore canceled registration for use of either chemical on alfalfa and clover.

We have accelerated the review of all registered uses of these and related chemicals, and reexamined all recommendations for their uses.

Recognizing the seriousness of the situation, the Secretaries of Agriculture and Health, Education, and Welfare recently requested the National Academy of Science-National Research Council to review the entire problem of "zero tolerances" and "no-residue" registrations. We should have its recommendations early next year. We hope they will provide modern and reasonable guidelines for both farmer use and regulatory action.

We must also learn more about the effect of pesticides in the general environment. The fish kill in the lower Mississippi River illustrates that point. When extensive kills were reported in November 1963, the Louisiana State Wildlife and Fisheries Commission requested an investigation by the Public Health Service. Scientists of this agency concluded that the pesticide endrin was the most likely cause of the kill, but did not determine the method by which endrin and chemically similar aldrin entered the river.

Extensive investigation, hearings, and conferences have shown no substantial evidence that points to the farm use of chemicals as the source of contamination.

Developments such as those I have just mentioned underline the need for close cooperation among the public agencies involved. An important step toward better teamwork was made when the Departments of Agriculture, Interior, and Health, Education, and Welfare established a formal memorandum of agreement to coordinate all activities relating to the registration and safe use of pesticides. This gives us all better opportunities to work together for our common purposes.

I hope I have given you some idea of the way Federal regulation of pesticides works. Now let's glance at the State picture.

Under the impact of new materials and uses, the scope of State as well as Federal pesticide laws has increased. Today 49 States and Puerto Rico have laws to regulate the marketing of pesticidal products within their own boundaries. Some of these laws are less stringent than the Federal law; a few are more demanding.

The American Association of Pesticide Control Officials has developed a model State pesticide law that closely resembles the Federal law. These officials have been most helpful to the Department, and we

believe, to each other, in the development and administration of uniform Federal-State regulations. We look forward to still better coordination through this fine working relationship.

There are no laws authorizing a Federal agency to police users of pesticides to be sure they comply with instructions for safe use. Many States and cities, however, do require licensing of commercial pesticide operators, such as aerial spraying concerns and termite control companies. This type of local regulation has become an increasingly popular way to exert more effective control over large users of chemicals. At least 36 States have laws that regulate the use of one or more types of pesticides. Most of these States require that custom applicators be licensed with the State, and a few States require that all ground and aerial applicators be licensed or obtain a State permit.

Both State and Federal officials keep pesticide regulation under continuing review in the interests of safety. We are cancelling registrations or changing our requirements whenever evidence indicates the need for such action.

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KEEPING MEAT FREE OF AGRICULTURAL CHEMICALS AND BIOLOGICS CURRENT SERIAL RECORDS

Talk by Dr. Robert J. Anderson, Deputy Administrator, Agricultural Research Service, U. S. Department of Agriculture, before the National Livestock Feeders Association, Chicago, Illinois, February 18, 1965.

Public agencies share responsibility with the livestock and meat industry for keeping our meat free of residues of agricultural chemicals and biological agents. We need to come together often, as we have today, to assess the problems that can arise in regard to residues, and to redefine our areas of responsibility for them.

Pesticides, hormones, feed additives, antibiotics, and other drugs and chemicals are essential to our agricultural production today. They are powerful substances by design and necessity. Therefore, if they are misused, they are capable of causing harm to those applying them, to the crops and livestock on which they are used, to fish and wildlife, and to the consumers of products that contain them.

To prevent any such harmful effects, much work goes on behind the scenes long before one of these helpful and potent products reaches the user. The U. S. Department of Agriculture has many duties in keeping meat free of unwanted residues -- particularly from pesticides.

Through research, we establish and recommend production practices that adequately protect livestock from pests and diseases without building up chemical residues in animal flesh.

Through regulation, we assure livestock producers that the labels on pesticide containers provide precise instructions for safe and effective use. We also regulate the production and distribution of biological products used in preventing and treating animal diseases, to make sure that ample supplies of pure, safe, and effective materials are available.

And, through education, we get these pertinent facts to the people who need to know.

The Food and Drug Administration has comparable responsibilities for safeguarding the use of drugs and feed additives.

These fields of responsibility in research, recommendation, regulation, and education are constantly affected by new developments in science and agriculture. For example, during the past year or two the sensitivity of methods used for detecting chemical and biological residues has been greatly increased. Some substances not detectable at one-tenth of a part per million a year ago can now be found at levels as low as parts per billion and even trillion.

Therefore, human food or animal feed can legally be seized if tests now reveal traces -- previously undetectable -- of a material for which no residue is permitted.

Of course, such developments directly affect you as well as us. Chemical and biological aids go to livestock producers after manufacturers and public agencies have worked together to produce materials that are safe and effective when used as directed. The way you handle and apply these products determines whether or not illegal residues remain in meat animals when they go to the packing plants.

At the plants, Federal responsibility reenters the picture. USDA's meat inspectors are a final guarantee that meat reaching the public is wholesome and free of unhealthful residues.

Meat inspection, formerly with the Agricultural Research Service, is now in the Consumer and Marketing Service along with activities of the former Agricultural Marketing Service. This is one of the services reporting to Assistant Secretary Mehren who is on your program later.

In determining the wholesomeness of meat that moves in interstate commerce, USDA's authority and responsibility begin with animal inspection before slaughter. They end only when the finished meat product leaves the plant with an inspection stamp of approval. To detect conditions that affect wholesomeness, inspectors depend on specialized training supplemented by laboratory support.

Many things affect wholesomeness -- disease conditions, bruises, bacterial contamination, and chemical and biological residues. As you know, the law permits residues of a few materials in meat if they are within the limits -- called "tolerances" -- that the Food and Drug Administration sets as safe. If enough of a chemical or biological agent is present to cause clinical evidence of abnormality, it obviously affects wholesomeness; however, meat containing any illegal residue is considered unwholesome, resulting in condemnation of the carcass with financial loss to the packer.

Federal inspection has been protecting the consuming public from meat containing illegal residues -- both chemical and biological -- for a long time.

Last November, the Department amended its regulations and outlined its procedures and standards of compliance for keeping undesirable residues out of meat. This action merely formalized, for the benefit of the public, procedures that have been used for many years. States are acting to prevent residues, and foreign governments show increasing concern. Already our meats are having a tough time meeting the requirements of certain foreign countries. They must be free of residues.

Livestock producers and meat packers are vitally involved with this whole question of residues. I'm sure they try to present for slaughter and inspection only those animals that will meet the high standards of wholesomeness the public expects. Certainly reputable packers, producers, and feeders would no more want animals containing illegal residues to go to slaughter than they would animals affected with rabies or exposed to anthrax. The stakes are too high for anyone associated with the industry to take a chance. I am confident that efforts to provide only completely acceptable meat animals will continue.

Fortunately, the meat industry has not been involved in recent questions of pesticide and biological residues to the extent that some agricultural industries have. All cases have proved costly to those concerned. However, we cannot afford to feel complacent on this score. We can expect residue tests to be refined even more in the future. Only constant vigilance will keep meat free of illegal residues. The USDA's meat and poultry inspection will step up its residue surveillance testing.

We can attribute the fact that the meat industry has not been involved, except at local levels, to watchfulness in many areas. First is the awareness of livestock producers, feeders, and packers of the need for safe and proper use of chemical and biological agents. And last, but not least, is the guardianship of Federal and State meat inspection, which helps the packer provide the consumer with wholesome meat.

Each time a problem has arisen, an immediate cooperative effort by industry, the States, and the USDA has resulted in corrective action.

An example of this teamwork, which has proved successful time and time again, took place in the 1950's. Meat inspection surveillance revealed a serious problem of pesticide residues in the southeastern and southern States. An investigation showed that general livestock practices -- including control of flies, ticks, and other pests -- were contributing causes.

The Department took a hard look at its recommendations for the use of pesticides, including those used on livestock and livestock feed crops. Then packer groups, cattlemen's associations, State Departments of Agriculture, the Federal Extension Service, the Agricultural Research Service and others launched an extensive educational effort. They conducted a highly successful program with farmers, livestock producers, and feed operators. Their theme was the "Safe and Proper Use of Pesticides" and their slogan was "Read the Label and Follow Directions." As a result, changed practices eliminated that residue problem; the campaign worked.

However, we must continue to spread the word to prevent future residue problems.

The Department has stepped up its efforts to educate both the consumer public and the agricultural industries on the safe use of agricultural chemicals. We utilize publications, newspaper and magazine articles, news letters, radio, television, posters, exhibits, motion pictures, and speeches. The States do likewise. As an example, I have brought enough of one of our leaflets, Mr. Livestock Producer, for each of you to have a copy. I hope you find it helpful.

There is more to be done. We must get the message across to every individual associated with the production and marketing of livestock, starting with the grain and forage producer and the feed manufacturer. The message is this: If we are to continue to have the pesticides, hormones, and feed additives that are essential to modern agriculture, we must use them properly. If not, they will be prohibited. It is as simple as that.

It is up to you to bear down on your fellow livestock feeders, because you probably occupy the most vulnerable position of all in meat production. Careless or improper use of chemicals and biologics by a few can affect the whole industry adversely. I'd like to review with you half a dozen of the preventive practices that must be followed, from the time animals enter the feedlot until they go to slaughter.

First, if you dip, spray, or dust animals when they enter the feedlot, be sure you get the right pesticide for the job. If it's the proper use, and you follow its directions, unsafe residues will disappear before slaughter time comes around. Use only registered materials.

Second, in later control of flies and external parasites, you need to observe similar precautions, whether you apply chemicals directly or use mechanical devices such as back rubbers.

Third, you must make sure there is no way for chemicals used in bird or rodent control to find their way into livestock feed and water. Here again, using a registered product and following directions to the letter should prevent contamination.

Fourth, you need to go beyond your own operations and try to determine the origin of the forage and grain you use for feed. Make sure that it was produced in accordance with safe practices . . . that if any agricultural chemicals were used, the treatments were carefully measured and timed as recommended. If it is stored, including storage by you, be sure that if pesticides are used to control stored grain insects, that a proper agent is used. Inquire of the producer of the feeder cattle you buy whether he follows recommended practices in the use of pesticides -- assist in creating an awareness of the need to use them properly.

Fifth, observe all the precautions necessary for proper use of drugs and feed additives, as my fellow member on the panel, Mr. Kirk, advises. He has alerted you to the potential problems their misuse can cause.

And sixth, I want to emphasize the need for care in the use of veterinary biologics. Whether you or your practicing veterinarian administers serums and vaccines, be sure to allow sufficient time for any possible residues to disappear before the animals are slaughtered.

Well, there it is. If illegal residues should be found in meat, its public image would be greatly harmed. That damage would not stop with the packer; it would go right down to the producer and even to the man who grows the feed the livestock consumes.

Your position in the chain of responsibility is crucial. You cannot pass this problem forward, because you are the last link in livestock production before animals are slaughtered. And you cannot pass it backward, because you will be held accountable for even the feed you use.

In our shared responsibilities, the Department, like the States, stands ready with all its resources to make the benefits of modern technology available to livestock producers. Working together, we can continue to provide consumers with an abundant meat supply without risk of its contamination.



(CORRECTED COPY)

AUG 20 1965

THE RESPONSIBILITIES OF VETERINARY PRACTITIONERS AS TO THE USE OF PESTICIDES
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July 14, 1965

Talk by Dr. Robert J. Anderson, Deputy Administrator, Agricultural Research Service, U.S. Department of Agriculture, before the Regulatory Section of the American Veterinary Medical Association, Portland, Oregon, July 14, 1965

I appreciate this opportunity to discuss the subject of pesticides, and pesticidal and biological residues. As veterinarians you are becoming more concerned and involved with the pesticides subject.

In talking about the responsibilities of veterinary practitioners as to the use of pesticides, I'm talking to everyone here -- including myself.

Certainly we veterinarians don't need to be reminded of how essential it is to have good tools for controlling agricultural pests and diseases. Chemical pesticides and biologics -- so far -- have furnished our best protection against some of the health hazards of livestock. These materials have helped farmers and ranchers to supply an abundance of high-quality, reasonably priced food and fiber, and have contributed much to the health and comfort of man as well as animals.

Veterinarians also need no reminder that we must handle these materials with meticulous care. All our training has emphasized the need for using them precisely and sparingly.

Misuse can result in a variety of hazards, particularly to human health. Misuse can lead to seizure of farm products contaminated with illegal residues. And every case of accidental or careless misuse of pesticides is bound to add to the pressure for suppressive legislation.

You know where some of the potential problems are:

In homes and gardens, users must be sure to choose the right pesticide, apply it exactly as the label prescribes, and store it properly.

Farmers and ranchmen have similar problems, but on a larger scale. To avoid pesticide residues in food or to keep residues well within the limits legally permitted, pesticide users must withhold cattle from treated pasture prior to slaughter, control flies on cattle and in dairy barns without leaving residues in milk, and time applications on feed or food crops at the prescribed interval before harvest. They must avoid or minimize hazards to wildlife and beneficial insects by using insecticides sparingly and only where they are needed, avoiding contamination of streams and other bodies of water.

As I see it, a veterinarian has major responsibilities with regard to safe pesticide use: to keep informed, to conduct his own operations safely, and to provide professional advice to others.

It goes without saying that a professional will conduct his own operations safely if he knows how, so I want to talk about his other responsibilities in this field.

Let's look first at the matter of keeping informed. Our education on pesticides should be based, of course, on solid training in colleges of veterinary medicine. I hope that every school is now covering the subject of pesticides thoroughly, and emphasizing to students their future responsibility, as veterinarians, for seeing that these materials are used with care.

After college, staying abreast of current scientific advancement becomes a day-to-day matter of continuing education in this ever-changing world of technology. We need to review the professional journals regularly and keep posted on information available from the States, the United States Department of Agriculture, and other agencies concerned with the use of pesticides.

There's certainly a lot of such information available. In our Department, for example, we have stepped up our educational efforts with the general public, with farmers, and with the agricultural industry. Over the past ten years, we have printed and distributed to the public more than 30 million copies of publications on pest control.

We've prepared exhibits, motion pictures, and radio and television announcements. We work closely with farm papers and magazines to encourage articles on the safe use of pesticides, and we've gotten wonderful cooperation.

The States are similarly prolific, and the county agent system multiplies all these efforts manyfold. Today, there is a chemical education leader in every State who funnels pertinent pesticide information on to the county agents. Their joint activities for a single year resulted in nearly 3,000 newspaper and magazine articles, 2,500 news letters, 1,500 TV appearances, 2,800 radio programs, 9,000 public meetings, and the printing of nearly 1,500 publications on pesticide use.

Pest control is often a community concern, and here veterinarians can play an active role. You address a good many local groups, and are listened to with respect. Few people in this country have the opportunity you have to put across the message on safe use of pesticides.

Our Department is urging that a pesticide committee be established in every county. The committee's prime objective would be to promote the safe and proper use of pesticides and biologics. Its membership should represent all affected segments of agriculture, along with public health, conservation, and other groups having a stake in pesticides and their use. You should make sure that representatives from the veterinary profession are on these committees.

The flood of information that goes out on safe use of pesticides is of course available to the livestock grower. He may take it or leave it. But one thing is certain -- he expects the veterinarian to know. A lot of farmers and ranchmen depend on you for guidance.

The veterinarian in private practice and the veterinarian in public service often meet on common ground as they seek to promote animal health and the safety of our food. Some of the problems we face in the U.S. Department of Agriculture may also confront you. I'd like to mention a few.

In the course of your dairy and meat animal practice, for example, you may advise livestock owners on finding the management practices that will prevent harmful and costly residues from occurring in their livestock.

Unfortunately, not all the answers are cut and dried.

Take the matter of livestock feed. The question of trace residues of pesticides in livestock feed -- and subsequently in milk or meat -- has been causing some pretty severe headaches lately.

As you know, before a new pesticide can be put on the market, it must be registered with our Department. To obtain such registration, the manufacturer must provide us with extensive data -- including complete toxicological studies -- to show that the new material is safe and effective when used according to the directions and proposed label.

If a residue on food is involved, we withhold any approval until the Food and Drug Administration establishes a safe tolerance. In the case of milk, no residue is allowed, and the tolerance is automatically zero.

It is this "no residue, zero tolerance" concept that has been giving a lot of people concern lately. In the past, many valuable uses for a large number of pesticides have been registered on the basis of perfectly good proof that there would be no residues if the directions were followed. The research to support these registrations was based on tests for detecting residues that were sensitive to as little as a tenth part per million.

Today these are rapidly becoming horse-and-buggy standards. Scientists are now talking in terms of detecting parts per billion and even parts per trillion. These are fantastically small amounts -- but obviously a part per anything, no matter how small it is, is still not zero. So we've had a situation where a farmer might apply a pesticide in good faith, carefully following recommendations for use, and then have his product subject to seizure, simply because scientists with their new knowledge and equipment can find a residue today that they couldn't have found yesterday.

At the request of the Departments of Agriculture and Health, Education, and Welfare, the National Academy of Sciences -- scientific adviser to the Federal government -- has reexamined the question of "zero tolerance" and "no residue." The Academy has proposed a more realistic approach to this situation, and the Departments are now considering its recommendations.

In the meantime, we have continued to take a good hard look at our recommendations for use of pesticides. These are modified and updated where necessary to meet changing conditions.

Another continuing job is the review of all no-residue registrations. Where present laboratory techniques do not support such a registration, steps are taken to modify it and in some cases cancel it.

In research, many scientists of different disciplines in a number of locations are trying to determine the effects of persistent pesticides on growing crops. It may be that, when we have all the information, we will find that alfalfa and other forage crops that are to be fed to livestock shouldn't be grown for several years on land where persistent pesticides have been used. We are depending heavily on research for answers we must have if livestock producers and dairymen are to be absolutely sure of the risk that may exist.

We keep the manufacture of veterinary biologics under surveillance in the Department to be sure the Nation's supply is ample, effective, potent, and safe. Not too long ago, we found that a rather alarming percentage of biologics was substandard. Therefore, in our surveillance activities we now put greater emphasis on checking the laboratories that produce these biologics.

Our results to date are most encouraging. Under our intensified surveillance, this percentage of substandard materials has decreased greatly -- from 13 percent in 1963 to 8 percent in 1964. The most startling improvements were in the quality of vaccines for bovine rhinotracheitis and rabies. However, we need to expand this work further to make sure an adequate supply of safe and potent veterinary biologics can be put in your hands.

When antibiotics, hormones, thyroid depressants, and other medication are used on meat animals, it is your responsibility to caution the owners to withhold the animals from slaughter long enough to avoid possible illegal residues that would cause the animal to be condemned.

It is obvious that the presence of illegal residues in meat would damage public confidence in the wholesomeness of this food.

USDA inspectors check both meat and poultry for biological residues.

Back in 1949, the agents that could remain in meat as toxic residues were increasing in number and use. Federal meat inspectors began studies then for detecting and evaluating chlorinated hydrocarbons in meat. Since that time, the work has greatly expanded, and highly sensitive and sophisticated techniques have been developed to identify and measure residues that are biologically active -- the toxic substances that are incorporated in tissues during the life of the animal. The sixteen years of expanded work since then have helped us to identify -- and thus help to correct -- many of the local problems that cause residues.

The widespread use of antibiotics, arsenical preparations, and tranquilizer drugs, and the rapid increase in the use of medicated feeds, have added to the problems of meat inspectors. Laboratory facilities have been expanded, and the person who proposes a new chemical for use with livestock must provide an acceptable analytical method to determine whether an unsafe residue remains in the meat.

Recently, meat has been condemned for illegal residues caused by a variety of practices.

Sometimes iron compounds injected in hogs and cattle discolored the tissues. Or unapproved muscle relaxants were used to subdue unmanageable livestock. Or unauthorized drugs were used experimentally on animals. Or hormones, antibiotics, arsenicals, and pesticides were used improperly or withdrawn inadequately. For example, some cattle picked up excessive pesticide residues from back rubbers.

If producers and feeders had been instructed properly in using these substances, and had followed these directions, they could have prevented these condemnations. They are already being held responsible for some of these losses by a few packers. Veterinarians can expect more demands for guidance in this area.

The Department has other activities in the pesticide field. We practice and encourage the use of those means of effective pest control that provide the least potential hazard to man and animals.

We monitor the use of pesticides not only in our pest control programs, but also in typical agricultural areas of the United States where they are used extensively.

We sample and study just about everything that lives, breathes, and grows in these monitored areas. Domestic animals that live or graze on the farms being monitored are fitted with special ear tags. After death, samples of their vital organs will be analyzed. We test poultry and eggs, and make blood cholinesterase determinations on domestic animals. We are also expanding our studies of small mammals and aquatic organisms in the monitored areas to determine pesticide levels and possible biological magnification in the food chain.

In research, we are exploring many new approaches to pest control that may curtail the need for toxic pesticides.

Most of you are familiar with the use of the sterility principle in eradicating the screwworm from most of the United States. Flies were sexually sterilized and released by the millions. Native female flies mating with the sterile males failed to produce offspring, thus eventually eliminating the native fly populations.

Entomologists now know what it will take to sterilize ticks, and have done some work on hornflies. Two insects for which we have worked out a practical control method through use of sterility are the screwworm fly and the housefly.

Down on Grand Turk Island in the Caribbean, along the Atlantic Missile Range where Colonel John Glenn landed after his pioneer venture into space, entomologists are using sterility induced by both atomic radiation and chemosterilants in a war against houseflies. It is interesting -- but not surprising -- that cases of human dysentery on the Island dropped dramatically, along with the housefly populations, as this experimental eradication effort progressed.

Research is also going on in Africa to learn if the sterilization principle might be useful against the tsetse fly, which spreads human sleeping sickness, nagana of livestock, and other trypanosome infections.

We are also watching with interest research that the World Health Organization is conducting in Burma on mosquitoes that transmit filariasis.

Mosquitoes are hard to sterilize sexually, so scientists want to promote another form of race suicide there. They hope to rear and release strains of mosquitoes enough like the disease-carrying strains to mate with them, but different enough that they won't reproduce. Nobody is sure this method will work in actual practice. If it does, it avoids the necessity of any kind of treatment to induce sterility.

Since mosquitoes help to spread animal diseases, the findings in Burma may have implications for veterinary medicine in controlling some livestock diseases without conventional pesticides.

Other imaginative approaches may place new physical and biological -- as well as chemical -- weapons in the hands of veterinary practitioners, to help them protect the wholesomeness of our meat and the health of our animals.

These are some of the things we in USDA are doing about pesticides. In conclusion, I want to emphasize that local veterinary practitioners are much closer to the places where trouble often starts than we are. If veterinarians fulfill their three responsibilities in regard to pesticides . . . if they understand the proper use of these materials, and the problems misuse can create . . . if they use pesticides wisely in their own practice . . . and if they educate others in their safe use, they will develop a competence that will enhance their own effectiveness and reputation tremendously. They will also increase the confidence and respect of agriculture and the public in the veterinary profession.

Agriculture -- including the livestock industry -- depends on the continued availability of pesticides and biologics. All of us who are involved -- the veterinary profession, the Federal and State departments of agriculture, and all the other interested groups -- should join together in aggressively promoting the proper use of these materials.

A campaign of prevention can be much more fruitful than a campaign of correction.

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UNITED STATES POLICY ON LIVESTOCK IMPORTS

Talk by Dr. R. J. Anderson, Deputy Administrator, Agricultural Research Service, U.S. Department of Agriculture, before Second Annual Charolais Congress, Kansas City, Mo., October 16, 1965

It is a very great pleasure to participate in your second annual Charolais Congress. This is my first meeting with your organization. I am impressed with its enthusiasm, interest, and vitality, and the wide scope of the activities you have underway here. I cannot take them all in, as I would like to. But I can talk to you about something I know is of great interest and concern to you as breeders of Charolais cattle. I am referring to the policy of the United States on importing cattle.

Many of you look upon this policy as the major obstacle to building up the Charolais cattle industry in the United States. Some of you may regard it as restrictive only where your breed is concerned and permissive where others are concerned. And all of you are wondering, I am sure, about the chances of easing up on the stringent regulations that govern the importation of livestock.

Let me say first that there are good, sensible reasons for these regulations. They are not capricious or arbitrary. They represent the best thinking of our animal scientists. All judgments and decisions have been made with one basic objective in mind -- to protect the health and safety of our domestic livestock industry as a whole.

Now let me tell you a little about these regulations.

Legislation passed in 1884 established the framework for our current animal quarantine laws. It specified that animals had to be certified free of disease before they could be exported to other nations. This, of course, made it necessary for us to develop our own eradication and control measures, and our current work on animal diseases stems from that law. We, in turn, could import animals from countries that had foot-and-mouth disease and rinderpest, providing the area from which the animals originated was free of the disease.

Then, from 1900 to 1930, we suffered six outbreaks of foot-and-mouth disease in the United States, each eradicated at great cost and effort. In order to protect our livestock industry and our economy from such devastating outbreaks, a law was passed in 1930 prohibiting the importation of ruminant animals, swine, and certain animal products from countries that had foot-and-mouth disease or rinderpest.

There is one exception.

Zoo animals may be brought in from countries where we believe these diseases exist, but under strict conditions that amount to life-time control and quarantine. Animals are kept at the foreign port of embarkation under the supervision of that country's veterinarians for 60 days before being shipped to the United States. The animals must then spend an additional 30 days at an American port of entry before being released only to specifically approved enclosed parks or zoos -- there are 43 throughout the country -- which have been inspected and approved to receive these animals. The animals are individually certified and tattooed for identification.

That being the case, why isn't it also possible to import beef cattle under the proper conditions? We have to look to Great Britain and certain other European countries for the answers.

Great Britain is one of the few cattle-producing countries in the world today that make a determined effort to eradicate each outbreak of foot-and-mouth disease by slaughtering infected and exposed animals. Outbreaks occur infrequently, they are limited, and they are promptly eliminated without the use of vaccination.

Incidentally, Great Britain's imports of fresh meats from foot-and-mouth countries are considered to be the source of the outbreaks. She has weighed the cost of eradication against the economic importance of the trade and has elected to stand the cost of eradication. Strict control over movements of livestock aids greatly in Britain's ability to successfully handle each outbreak promptly.

Unlike Britain, most other countries vaccinate their livestock and may or may not slaughter infected or exposed animals. Eradication is not considered feasible under existing conditions. Vaccination, however, gives only a short immunity. Animals must be revaccinated at frequent intervals. Also, vaccination tends to mask clinical evidences of the disease and results in carrier animals. And there is a continual reservoir of infection.

Our laws make no distinction between Great Britain and other countries in terms of the way they handle foot-and-mouth disease. On the other hand, Canada and Ireland import cattle from Great Britain under certain quarantine requirements at times when the disease does not exist.

As you know, some animals coming into Canada from Great Britain do get into the United States. We take the position that animals remaining in Canada for at least 60 days exclusive of any quarantine period are officially Canadian "citizens." And, if they are free of foot-and-mouth disease, and have not been exposed to it, recovered from it, or vaccinated against it, they are potentially eligible for entry into the United States.

Clearly, the British methods of handling foot-and-mouth disease are such that animals born in that country can be brought into the United States at times from Canada or Ireland with safety. The disease situation and the methods of handling the disease in other European countries are such that we cannot afford to take the risk of importing their animals.

So that's the situation. Some people believe the laws are more restrictive than necessary. Nothing speaks louder than success, however. And it is a fact that since these prohibitory laws went into effect in 1930, we have had not a single case, not a single outbreak of foot-and-mouth. In the preceding 30-year period, as I have indicated, we suffered through six of them. So we believe the laws have paid off in saving our livestock industry from one of the most ruinous, most financially disastrous livestock diseases in the world today.

As our scientists learn more about foot-and-mouth disease, as they refine their knowledge of disease in general, then we can adjust our requirements as new knowledge will permit.

A move in this direction is the recent action permitting breeders to import animal semen from countries where foot-and-mouth disease exists. You are all aware of this new amendment to the existing regulations. And you know that it provides stringent procedures for the safe importation of the semen of ruminants for herd improvement in the United States. Many of you may feel that these methods for obtaining new certified germ plasm are unduly restrictive. Yet only $1\frac{1}{2}$ years ago, no procedures at all were available for importing germ plasm. So progress is being made continually.

In his talk to you last year, Dr. Clarkson outlined these new regulations. Because of their importance to you and the livestock industry of the entire country, I would like to go over them again.

These regulations for the importation of semen require:

1. Prior permit from the Agricultural Research Service.
2. Deposit of funds with ARS to cover expenses.
3. An ARS veterinarian to inspect the donor animal on the farm of origin, and to examine all other available information in an effort to determine whether there is evidence of exposure to disease.
4. No vaccination for foot-and-mouth disease or rinderpest.
5. Tests of blood samples from the donor animal.
6. Isolation of the donor animal under conditions acceptable to the ARS veterinarian.
7. Collection of semen under direct supervision of an ARS veterinarian.
8. Rigorous tests of each lot of semen.
9. Repeat tests of blood samples from the donor animal.
10. Release of the semen by ARS when all requirements have been met, or, disposal of the semen if requirements are not met.

We know, of course, that the program is not feasible commercially and that the cost to importers is very high. The tests and additional precautions add to the delay and the cost. Yet the combined screening effect of these prescribed precautionary measures will insure the necessary safety.

We know, too, that this technique provides only half of what Charolais breeders want. There's no substitute for importing dams and sires to build pure foundation stock. But even this half -- the new opportunity to import semen -- provides the new germ plasm that is needed for further development of the Charolais breed in this country.

As you may know, there is a very interesting and somewhat controversial new development taking place in Canada which may have some repercussions in the United States, and which is of the greatest interest to the entire livestock industry of our country. I am referring to the establishment by the Canadian Government of a maximum security quarantine station for importation of breeding livestock from certain European countries where foot-and-mouth disease exists. This station is located on Grosse Ile in the St. Lawrence River not far from Quebec.

Detailed procedures have been developed involving extended quarantines, special testing, and controlled movements of all animals to prevent the introduction of foot-and-mouth into North America. These procedures were developed after a full evaluation of the risks involved, the state of scientific knowledge in this field, and after full consideration of the opinions of scientists of Canada, Great Britain, and the United States. Any changes in these safeguards will be checked with ARS before they are implemented.

Our scientists have been in close touch with the Canadian authorities, and have discussed the procedures in great detail. In the opinion of our people, if all of these detailed procedures are meticulously followed, animals can be imported safely and will not constitute a threat to the livestock of Canada or the United States.

We have accepted the invitation of the Canadian Government to assign one or more of our scientists to observe and review the procedures during all stages of the quarantine and testing operations. Our representatives will also be present when the animals are selected for shipment to Canada.

The plans do not provide for importing cattle from France into the United States by way of Canada. However, after such cattle have met all of the quarantine and testing requirements and have become part of the livestock population of Canada, they would be potentially eligible for importation into the United States as Canadian animals. All the import requirements of this country would, of course, have to be met.

The program, which is just now getting underway, will be a strictly Canadian operation. The Department of Agriculture has no plans for modifying the present restrictions on the importation of livestock or livestock products from countries where foot-and-mouth disease exists. Let me assure you that our regulations will be limited to those measures necessary to protect against entry of diseases -- no more and no less.

But it's safe to say that we will be watching this new venture with a great deal of interest. The information and experience we gain from observing the Canadian experiment may go a long way in helping this country to shape its plans for the future.





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